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ABSTRACT

This document consists of the final report and sample curricula from the Rural Textile Workers Literacy Enhancement Project. The final report details how the project was initiated in April 1993 to help employees of five textile and apparel manufacturing companies in southeastern Alabama improve their literacy and numeracy skills. A second objective of the project was to provide a model demonstration site for replication throughout the textile industry. Project staff collaborated with industry representatives to identify job tasks, conduct needs assessments, develop an industry-specific curriculum, and deliver instructional programs at four worksites. The project consisted of three main components: the Gateway component (instruction in basic reading, writing, speaking, listening, and computation); the Pathway component (activities to develop problem-solving, teamwork, critical thinking, and decision-making skills); and the Linkway component (support services for participating workers). Project services were provided to 1,163 individuals. Following the project report are a workplace curricula catalog and sample curricula. The sample curricula contain the following: a workplace writing learning module for first-line supervisors/clerical workers, a measurement and numerical skills module for loom technicians, and four measurement and numerical skills module for sewing machine operators. Each module includes some or all of the following: a lesson plan detailing objectives and motivational, instructional, and culminating activities; vocabulary lists; student handouts; and pre- and posttests and answers. (MN)

ED 377 333

Rural Textile Workers
Literacy Enhancement Project

FINAL PERFORMANCE REPORT

Enterprise State Junior College
MacArthur State Technical College
Southeast Alabama Adult Education Network
Clinton Mills
Covington Industries
Opp and Micolas Mills
Pridecraft Enterprises
Shaw Industries

Funded by the U. S. Department of Education
Grant Number V198A30143

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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Introduction

The Rural Textile Workers Literacy Enhancement Project was established in April 1993 to serve employees of five textile and apparel manufacturing companies in Southeast Alabama and to provide a model demonstration site for similar programs in the textile industry. Project staff and industry representatives identified job tasks, conducted needs assessments, developed industry specific curriculum, and conducted instructional programs at four worksites. The project served 1163 persons and consisted of three main components. The Gateway Component provided instruction in basic reading, writing, speaking, listening, and computation. The Pathway Component focused on improving skills in such areas as problem solving, teamwork, critical thinking, and decision making. The Linkway Component provided the necessary support services to allow workers to fully participate in the project.

Selected indicators of project success include the following:

-- Response to unique needs of a diverse group of industries -- an essential factor in significantly upgrading worker skills in rural areas.

-- Realization of a value of upgrading worker skills as evidenced by willingness of individual partners to allow release time and to continue and expand employee training.

-- Acceptance by workers of need and ability to continue upgrading skills as evidenced by willingness of workers to seek additional training after the project ended.

-- Evidence of worker self-reliance and self-esteem as indicated by worker and supervisory reports.

-- Better understanding of the roles of industry and education resulting in an ongoing positive relationship between the colleges and industries.

-- Realization of non-partner industries of the need for training as indicated by requests for workplace literacy training.

-- Contributions by other funding sources to provide training beyond the scope of this project.

-- Significant numbers of GED recipients and other project participants enrolled in Enterprise State Junior College credit courses in order to further enhance employment skills.

-- Realization by participating industries that the monetary costs of employee training must be viewed as a vital part of a firm's capital investment.

-- An awareness on the part of the educational community of the scope of workplace skills training programs.

-- Commitment on the part of project participants to provide offspring with a level of education commensurate to workplace demands.

Comparison of Accomplishments to Objectives

Objective 1: By April of 1993, all project personnel will have been employed and given specific job descriptions.

In April 1993, seven staff members were employed and given job descriptions. These included a project director (50% time), a counselor/instructor, a secretary (50% time) and two part-time instructors at Enterprise and an assistant project director/counselor and secretary (50% time) at MacArthur. Additional instructors and aides were employed as classes were added.

Objective 2: By June of 1993, project personnel will have designed job specific literacy audits in cooperation with industrial personnel.

Project staff used a modified DACUM process and the Comprehensive Adult Student Assessment System (CASAS) Workplace Analysis Job Profile as the primary means of conducting job-specific literacy audits. (See Appendix A: Job Analysis and Workplace Analysis--Loom Technician.) A job analysis was completed for each of the following job classifications at Clinton Mills, Pridecraft Enterprises and Shaw Industries:

Clinton Mills
- Cloth Inspector
- Doffer
- Loom Technician
- Slasher Operator
- Spinner
- Spooler
- Tying-In Operator
- Weaver

Pridecraft Enterprises
- Clean-up
- Double Needle Sewing Machine Operator
- Inspector
- Mechanic

- Roll Loader/Spreader
- Sewing Supervisor
- Shipping Clerk
- Single Needle Sewing Machine Operator
- Trainer
- Work Handler

Shaw Industries

- First Line Supervisors
- Heat-set Operators
- Heat-set Process Maintenance Technicians
- Texturizing Operators
- Twister Operators
- Twister Technicians

The CASAS Workplace Analysis Job Profile was also completed for the following jobs:

Lab

- Frequency Checker
- Lab Technician

Opening/Carding/Spinning

- Assistant Warper Operator
- Autoconer
- Autoconer Technician
- Backwinder Operator
- Carding Department Technician
- Carding/Drawing Operator
- Carding Technician
- Doffer
- Maintenance Technician
- Roll Picker Operator
- Roving Operator
- Service Operator
- Spindle Plumber
- Spinner
- Spinning Technician
- Spooler Department Technician
- Spooler Operator
- Traveler Specialist
- Warper Operator
- Warper Operator Assistant

Maintenance

- AEM Technician
- Air Conditioner Technician
- Assistant Maintenance Technician
- Building Technician
- Electrician
- Machinist
- Maintenance Security Clerk
- Maintenance Technician
- Plant Maintenance Technician
- Plant Maintenance Supervisor

- Plant Security Officer
- Roller Shop Specialist

Weave Room

- Assistant Tying-In Operator
- Assistant Slasher Operator
- Loom Technician
- Slasher Assistant
- Slasher Operator
- Tying-In Assistant
- Tying-In Operator
- Weaver

Supply Room

- Chief Supply Clerk
- Supply Clerk

Cloth Room

- Cloth Inspector
- Cloth Roll Coverer
- Cloth Room Technician
- Quality Grader
- Seconds Roller

Warehouse

- Assistant Warehouse Supervisor
- Janitor
- Warehouseman

Objective 3: By July of 1993, job literacy audits will be administered to participating workers in cooperation with industrial personnel.

Project staff completed job literacy audits for participating employees as they enrolled in classes. Results of the Test of Adult Basic Education and/or the Comprehensive Adult Student Assessment System were maintained in project files at Clinton Mills, Shaw Industries, and Pridecraft Enterprises.

Objective 4: Beginning in May of 1993, project personnel will develop and implement ongoing outreach activities in cooperation with industry and employee representatives which will result in the recruitment, intake, screening, Individual Education Plan development, and program participation of at least 500 eligible worker applicants by September, 1994.

Project staff and industry representatives implemented a variety of recruitment/outreach activities including development and dissemination of flyers, project orientation meetings for all shifts, personal contacts by project counselor, development and dissemination of a bi-monthly newsletter, quarterly receptions to recognize achievement and arrangement of local media coverage.

One of the most effective methods of recruitment/outreach at Clinton Mills was the involvement of an education committee composed of 17 employees who met monthly with the instructor/counselor. This committee assisted in planning and implementing all recruitment activities. (See Appendix B: Outreach/Recruitment Samples.)

Counselors and instructors developed a form for the Individual Education Plan (IEP) which identified goals of the participants, skills needs, need for support services, and curriculum to be used. Staff members worked with each employee to complete the IEP.

Records on file indicate a total of 1163 participants in project activities. Project files verify names, demographic data, individual education plans, attendance, support services, and outcomes.

Objective 5: Project personnel will develop, field test, and refine job specific instructional programs to include delivery systems, objectives, learning activities, and evaluation components. (ongoing beginning May, 1993)

The Dean of Development at Enterprise State Junior College provided leadership for the development of job specific curriculum. Project staff analyzed workplace materials, reviewed job audit results, and participated in curriculum development training sessions. Staff members developed more than 100 instructional modules in reading, math, language, oral and written communications, and leadership skills. Various modules were field tested in classes offered on site at Clinton Mills and Pridecraft Enterprises. Revisions were made in selected modules during the grant period. (See Appendix C: Sample Modules.)

Instructors working at Shaw Industries developed, field tested and revised workplace success skills modules for new employees. (See Appendix C: Sample Modules.)

Instructors at Clinton Mills and Pridecraft Enterprises also field tested Textdisc (Interactive Knowledge, Inc.), a multimedia workplace literacy courseware package designed specifically for the textile industry. The CD-ROM disc contains more than 40 hours of instruction in reading and math skills in the context of the textile industry. Evaluation results are included in Appendix D.

Objective 6: A minimum of 250 project participants will complete at least 12 weeks of instruction.

Records on file in the Project Director's office indicate that 104 employees attended classes for at least 12 weeks. An additional 354 employees at Shaw Industries completed the equivalent of twelve weeks (at least 48 clock hours) of instruction. At this worksite, new employees were given release time for instruction for 40 hours a week for two weeks prior to shift assignment.

Objective 7: 90% of employees who complete 12 or more weeks of instruction will retain employment or be promoted.

Ninety-five percent of the employees who completed the equivalent of 12 weeks of instruction retained employment throughout the grant period.

Objective 8: 90% of participants who complete at least 12 weeks of instruction will show statistically significant gains in their supervisors' ratings of work maturity including their communication, literacy skills, safety procedures, cooperation, problem solving abilities, interpersonal relations, punctuality, attendance, positive attitude, appearance, and task completion.

Using the CASAS work maturity checklist and information from industry supervisors, the instructor/counselor designed an appraisal form to assess supervisor perceptions of employee skills and work maturity. Pre and post appraisals completed by supervisors of a sample of 60 employees at Clinton Mills and Pridecraft Enterprises indicated that 82% of the employees improved work performance. Examples of areas of improvement included reading and interpreting general job-specific vocabulary, solving problems and arriving at decisions as a team member in a work setting, transferring or applying skills learned in one job situation to another, demonstrating positive attitude and completing tasks effectively with a minimum of supervision.

Objective 9: Project participants, in cooperation with industry, volunteer organizations, other college personnel, and appropriate governmental agencies will provide on-going needed support services for project participants. These services shall include, but not be limited to, tutorial services, transportation services, child care services, counseling services, and referral to other services.

Counselors and instructors provided support services for all project participants. The instructor/counselors at Clinton Mills and Shaw Industries documented counseling sessions and support services on Individual Education Plans. They assisted employees in obtaining eye glasses, scheduling GED testing, obtaining financial aid, and enrolling in other educational programs. Volunteer tutoring was provided to six employees of Clinton Mills and Pridecraft Enterprises. Transportation and child care were offered to participants, but these services were not used because most classes were provided on site during the work day or just before or after work shifts.

Objective 10: Project personnel will devise a Dissemination Plan which will result in project activities and outcomes being disseminated throughout the region and allow the project to serve as a demonstration site for rural textile workplace literacy programs. The plan will include the development and publication of a booklet on project goals, activities, and results which will be publicized nationally and disseminated to those who request it.

Project staff developed a dissemination plan that was approved by the Project Steering Committee and the National Workplace Literacy Program staff. The following actions to disseminate project information have been completed:

-- Presentations at five state conferences in Alabama including Alabama Workplace Education Conference

-- Presentation at National Association for Developmental Education Conference (funded by MacArthur State Technical College)

-- Presentation to Alabama Textile Manufacturers Association Education Committee

-- Presentation to Textile Engineering Department Faculty, Auburn University

-- Presentations to adult education and workplace literacy practitioners enrolled in two graduate courses at Auburn University: VED 591 Teaching the Disadvantaged Adult and VED 695 Practicum in Workplace Literacy

-- Press Conferences and area news coverage by newspaper and radio and television staff

-- Publication of articles in textile industry newsletters--Covington Connections, Eye on CMI, Common Threads: Connecting the Associates of Standard Textile, and Pridecraft

-- Response to National Alliance of Business for information for Workplace Literacy Clearinghouse

-- Dissemination of literacy task lists to the Institute for Educational Leadership, Inc. for projects to develop skill standards for occupations

-- Meetings with representatives of now-participating textile industries to encourage adoption of project materials and methods

-- Publication and dissemination of final report (including curriculum samples) to ERIC Clearinghouse on Adult, Career and Vocational Education and Clearinghouse of Adult Education and Literacy.

Project staff will continue to respond to inquiries from educational organizations and industries for project report, curriculum materials, and technical assistance

Objective 11: By July of 1993, project personnel will develop a detailed formative evaluation plan to monitor implementation of project activities. Summative evaluation will be performed by an experienced, qualified external evaluator to be contracted from project funds.

Project staff worked with an external evaluator to develop an evaluation plan that was approved by the Project Steering Committee and the National Workplace Literacy Program Staff. (See Appendix E: Comprehensive Evaluation Plan.) Evaluation requirements were monitored throughout the grant period by the Project Director. Periodic reports were provided to the Project Steering Committee. The external evaluator made three visits to the project. Copies of the evaluator's final report is provided under separate cover.

Objective 12: Ongoing workplace literacy activities will be institutionalized and continued in at least two of the industry partners' workplaces after the conclusion of USDE support.

Project staff met with industry personnel at Pridecraft Enterprises, Clinton Mills and Shaw Industries to discuss the need to institutionalize workplace literacy activities after the conclusion of USDE support. By September 2, 1994, three of the industries had committed funds to continue program activities. (See Appendix F - Institutionalization of Workplace Literacy Programs.)

Objective 13: 80% of employees who successfully complete at least 12 weeks of instruction will show significant gains in self-esteem as measured by a pre- and post-administration of the Coopersmith Inventory (or other appropriate instrument) with a sample of participants.

Instructors and counselors administered the Coopersmith Inventory as a pre and post test to a sample of 37 employees who completed at least 12 weeks. A t-test revealed gains at the .05 level.

Objective 14: As a result of project participation, at least 50 employees will obtain a GED certificate.

On September 30, 1994, a total of 44 project participants had obtained a GED certificate of high school equivalency.

Objective 15: Following conclusion of the project period at least two additional non-participating area textile industries will adopt the methods and materials developed in the project to address their workplace literacy improvement needs.

Project staff conducted preliminary discussions with representatives of the Alabama Textile Manufacturer's Association concerning dissemination of project materials. This objective will continue to be addressed.

Schedule of Accomplishments and Target Dates

Forty-four participants received a GED certificate by the end of September, 1994. The project had provided for fifty persons to receive certificates. Due to the nature of the employment policies of one of the largest partners, we were unable to meet that goal. Program participants at Shaw Industries were required to possess a GED certificate or high school diploma as a prerequisite for employment. Shaw employees represented over 50 percent of the total number of program participants. As a result, disproportionate numbers of GED certificates were earned by employees of the remaining partners.

Number of Characteristics of Project Participants and Outcomes Achieved

A total of 1163 persons participated in the project. Of that number, 1099 were employed by the industrial partners, 36 were employed by other businesses, and 28 were unemployed. The average age of participants was 32 years. There were 556 males and 607 females enrolled in the program. Seventy-five percent of the participants had been employed fewer than five years, 13 percent had from six to ten years' tenure, and 11 percent had been employed for more than eleven years with the same firm. Seventy-four percent of the participants were Caucasian. Blacks comprised 24% of the group, and Asians only 1%. The remaining 1% included Hispanics, American Indians, and others.

Outcomes achieved by project participants are described on Objectives 6, 7, 8, 13, and 14 under the section entitled Comparison of Accomplishments to Objectives.

Dissemination Activities

Refer to the dissemination activities described in Objective 10 of the section entitled Comparison of Accomplishments to Objectives.

Evaluation Activities

Refer to the evaluation activities described in Objective 11 under the section entitled Comparison of Accomplishments to Objectives.

Changes in Key Personnel

A number of changes occurred during the grant period due to the retirement and reassignment of key personnel. Phillip Johnson from MacArthur State Technical College replaced Polly Patterson as Assistant Project Director. Linda C. Wilson, Counselor/Instructor from Enterprise State Junior College, assumed the duties of Dr. Mary Bauer, Project Director, during the last two months of the grant period.

Appendix A

Job Analysis and CASAS Workplace Analysis Job Profile
Loom Technicians

JOB ANALYSIS
LOOM TECHNICIANS

Clinton Mills, Geneva, AL

Duties	Tasks
Share Workload with Weavers	Operate Loom While Weavers Break Obtain Supplies for Weavers Assist Weavers in Maintaining Production Correct Bad Warp Operate Loom While Weavers are Away from Job Repair Break / Outs
Change Cloth Styles on Machine	Adjust Machine for New Pattern Install New Pattern Clean Machine Set Up Machine for New Pattern Remove Old Pattern Obtain Part / Supplies
Catch Flags	Replace Broken Guide Teeth Replace Broken Harness Eyes Adjust Take-Up Replace Extra End Wheel Belt Clean Extra End Wheels Clean Machine Brakes Clean Machine Brakes
Communicate with Fellow Employees	Communicate with Filling Suppliers Concerning Loose Cones Communicate with Service Operator Concerning Cleaning Machine Communicate with Doffers Concerning Extra Doffs (oil changes, maintenance, etc.) Communicate with Shop (completing work orders warp-outs) Communicate with Warp Crew Concerning Planning Shutdowns Communicate with Supply Room Personnel Concerning Availability of Parts Communicate with Cloth Room Personnel Concerning Seconds Communicate with Weavers Communicate with Technicians on Preceding and Following Shift Repair Overhead Blower and Contact Shop Personnel for Assistance Communicate with Supervisor for Daily Work Assistance
Perform Preventive Maintenance	Clean Picking and Receiving Houses Blow Off Loom Clean Drive Chains Perform Six-Months Check Correct Oil Leaks Change Oil Change Sand Drums and Press Rolls Box the Shuttles Change Motors Rebuild Let-Off
Perform Break-Down Maintenance	Correct Oil Leaks Replace Drive Shift Replace Harness Lifter / Linkage Replace Broken Chains Correct Machine Jams Replace Bad Bearings Replace Stripped Gears Replace Torsion Bar Pins Repair Air Leaks Change Machine Pattern Change Accumulators Replace Tucking Units Rebuild Upper Housing Replace Broken Brake Bands Replace Sley Drive Units Replace Machine Leveler Pads and Re-level Machine Replace broken Shuttle Springs
Check For Seconds and Correct Flaws	Mark Cloth-Shift Number and Machine Number Perform Machine Adjustments Replace Feeder Grippers Replace Gripper Feet Straighten Guide Teeth Adjust Filling Brakes Adjust Take-Up Clean Let-Off Replace Accumulator Brush

Facilitator: Jimmy Hutto
Coordinator, Training for
Business and Industry
Douglas MacArthur State Technical College

Recorder: Gail S. Jones
Curriculum Specialist
Douglas MacAutrur State Technical College

Skills Required for Present and Future Jobs

- Stress Management
- Psychology Skills (people-skills)
- Demonstrate Patience
- Team-Building Skills (teamwork)
- Basic Math Skills
- Computer Skills Specific to Equipment
- Written Communication Skills
- Read Technical Manuals
- Electronics Skills
- Management Skills for Promotion

Panelists:

Chuck Brinley
Jay Husbands
Jeff Baker
Clyde Williamson
Richard Burch
Terry Dixon

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Workplace Analysis

Job Profile

LOOM TECHNICIAN

Job/Training Program WORKFORCE 2000 **Date** September, 1993

Contact Person ____________________ **Phone #** ____________________

Address ____

The **Workplace Analysis** can be used to identify the reading, writing, math, organizational, communication, problem solving, and workplace expectation skills that may be needed by an employee to succeed on the job or in training. The Workplace Analysis is available in two forms:

the **Workplace Analysis/Job Profile**, and
the **Workplace Analysis/Individual Profile**.

The **Workplace Analysis/Job Profile** can be used by workplace instructors to obtain an accurate analysis of specific basic skill competencies required to perform a job successfully. This replaces reliance on set reading or math grade levels, which do not accurately reflect the specific application of basic skills needed for success in employment or in training. The comment section is used to record information about the difficulty level and how frequently the specific skills are used during job performance or training. Workplace documents can also be referenced here.

The **Workplace Analysis/Job Profile** can be used to plan instruction that is concurrent with employment. The basis for curriculum will be specific, time will be used efficiently, and objectives will be targeted to meet the individual needs of employees for job related basic skills instruction. The specific basic skill requirements are cross-coded to the CASAS competency list to facilitate curriculum planning.

The **Workplace/Individual Profile** can be used by employers and basic skill instructors to determine an individual's ability to perform each basic skill in relation to the basic skill requirements of the job or training program. This information will be useful in establishing training and program interventions needed in order for the individual to meet the job requirements. The specific basic skill requirements are cross-coded to the CASAS competency list for use in establishing these interventions.

CASAS

Comprehensive Adult
Student Assessment
System

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CASAS

I. READING SKILLS

A. *Read and interpret vocational vocabulary.*

	Workplace Requirements of Job/Program				
	Must Know To Succeed	Not Expected To Know Before Beginning (Will Teach)	Not Important For This Program/Job	CASAS Competency Number *	COMMENTS
1. Read and interpret general vocational vocabulary. (e.g., danger, exit, manager's office)	✓			4.1.6.	
2. Read and locate information listed in alphabetical order. (e.g., files, parts, tools)	✓			2.1.1. 2.5.6. 2.8.3.	
3. Utilize reference materials and glossary lists in vocational texts, manuals, and handouts.	✓			2.5.6. 2.8.2. 4.3.2.	
4. Identify abbreviations and symbols specific to the job. (e.g., lb., UPS)	✓			4.1.6.	

B. *Read and interpret written vocational materials.*

	Must Know To Succeed	Not Expected To Know Before Beginning (Will Teach)	Not Important For This Program/Job	CASAS Competency Number *	COMMENTS
1. Read and interpret specific information from written materials, e.g., employee contracts, employee handbooks, personnel policies, business letters/memos, and job manuals.	✓			4.2.2. 4.2.3. 4.2.4. 4.3.2.	
2. Read and interpret written instructions from instructor and supervisor.	✓			4.4.3. 4.4.5.	
3. Read and interpret written sequential directions in textbooks, manuals and handouts.	✓			2.5.4. 4.2.4.	
4. Read and interpret employee/student progress records or performance appraisals.	✓			[illegible].4.4.	
5. Utilize table of contents, index, and appendices in textbooks, manuals and handouts.	✓			2.8.2. 4.3.2.	
6. Read and interpret basic instructions and labels in operating equipment and utilizing supplies.	✓			1.7.3. 3.4.1.	
7. Read and interpret charts, graphs, tables and forms.	✓			1.1.3. 4.4.3. 6.7	
8. Read and interpret maps, schematic diagrams, pictorial drawings, illustrations and blueprints.	✓	✓		1.1.3. 4.4.3. 6.6.5.	
9. Read and interpret basic switches and dials.	✓			1.1.4. 1.1.5	

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II. WRITING SKILLS

	Workplace Requirements of Job/Program				
	Must Know To Succeed	Not Expected To Know Before Beginning (Will Teach)	Not Important For This Program/Job	CASAS Competency Number *	COMMENTS
A. *Use Legible Writing and Appropriate Grammar.*					
1. Print or write legibly in ink.	✓			**	
2. Utilize appropriate mechanics of standard English.	✓			**	
B. *Utilize Occupational Specific Forms*					
1. Record date, time, and other requested information on work forms, charts, graphs.	✓			4.4.3. **	
2. Write common abbreviations specific to the job.	✓			4.4.3.	loom numbers and defect codes are abbreviated
C. *Write comprehensively.*					
1. Write information in clear, logical and complete manner.	✓			**	
2. Take telephone messages accurately.			✓	2.1.7. **	
3. Write short notes and/or simple memos.	✓			4.4.3. **	memos to supervisors and other technician
4. Write letters using correct structure and sentence style.			✓	**	
5. Use computer for simple word processing.	✓			4.4.6.	
6. Organize information into a brief written report.			✓	**	

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** Refer to the CASAS riting Assessment Manual and the CASAS Applied Performance Manual.

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CASAS

	Workplace Requirements of Job/Program: Must Know To Succeed	Not Expected To Know Before Beginning (Will Teach)	Not Important For This Program/Job	CASAS Competency Number*	COMMENTS
B. *Understand occupational specific use of mathematical symbols.*					
1. Interpret ratio and proportion, e.g., preparing mixtures, figuring pay rate.	✓			6.4.2. 6.4.5.	
2. Interpret data from graphs, e.g., line, bar, picture and circle graphs.	✓			6.71., 6.7.2., 6.7.3., 6.7.4.	
3. Identify lower case and upper case Roman numerals up to 1,000. (e.g., table of contents)	✓			6.0.1.	
C. *Utilize occupational specific measurement skills.*					
1. Calculate with units of time, e.g., figuring shipping schedules, use of time zones.			✓	2.1.3. 6.6.6.	
2. Perform basic measurement tasks determining length, width, height, weight, including the use of conversion tables.	✓			1.1.4., 1.1.9., 6.6.2., 6.6.7. 6.6.4.	use width conversions in changing loom styles
3. Read and interpret basic measurement and numerical readings on measurement instruments, e.g., ruler, scale, micrometer, gauge, scope; including identifying fractions in progressive sizes.	✓			1.1.4., 6.6.4., 6.6.5., 6.6.7	use of a micrometer in checking diameter of a bearing
4. Solve measurement problems in U.S. Standard or Metric units using linear dimensions, area, volume, weights, geometric shapes and angles.	✓			1.1.2., 6.6.2., 6.6.3.	

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CASAS

V. COMMUNICATION SKILLS

	Workplace Requirements of Job/Program				
	Must Know To Succeed	Not Expected To Know Before Beginning (Will Teach)	Not Important For This Program/Job	CASAS Competency Number *	COMMENTS
1. Follow spoken sequential directions.	✓			2.2.1. 4.4.5.	
2. Use the telephone to make and receive business calls.		✓		2.1.8.	
3. Interpret task-related communications such as following, clarifying, giving or providing feedback to oral instructions.	✓			0.3.1. 4.4.5.	
4. Formulate and ask questions.	✓			0.1.2. 4.4.5.	
5. Use appropriate non-verbal communication.	✓			0.1.1.	
6. Organize information into an oral report.	✓				
7. Utilize English that is acceptable with supervisors, peers and clients.	✓			0.1.4. 4.4.1.	
8. Eng[illegible] in appropriate social interaction with supervisors, the public, co-workers, and instructors.	✓			0.1.3. 4.4.1.	
9. Initiate action in response to requests from the supervisor, instructor, or customer.	✓			4.4.2. 4.4.5.	

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CASAS

B. *Understand employer and instructor expectations of workplace/classroom behavior.*

	Workplace Requirements of Job/Program				
	Must Know To Succeed	Not Expected To Know Before Beginning (Will Teach)	Not Important For This Program/Job	CASAS Competency Number *	COMMENTS
1. Identify situations in which employers and instructors usually expect work or school to have priority over personal affairs.	✓			4.4.1. 4.4.4.	
2. Identify situations in which action should be preceded by getting prior consent or advice from supervisor or instructor.	✓			4.2.3. 4.2.4. 4.4.1.	
3. Identify situations in which employee/student is expected to take the initiative to report an unsafe or unusual condition to supervisor or instructor.	✓			4.3.3. 4.3.4.	
4. Identify appropriate behavior, attitudes, and social interaction for keeping a job and getting a promotion.	✓			4.4.1.	

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Appendix B

Outreach/Recruitment Samples

WORKFORCE 2000 PARTNERSHIP

02-25-94 **Education Fact Sheet** Pridecraft

Q: *When will Workforce classes begin?*

A: **Classes scheduled for Tuesday/Thursday will begin on March 3. Monday/Wednesday classes will begin on March 7.**

Q: *Will all classes begin on those dates?*

A: **Some classes will begin later, due to special equipment and instructional requirements of the course.**

Q: *Will all the classes meet at Pridecraft?*

A: **Basic skills classes are scheduled to meet inside the plant. Leadership, Communication, and Computer courses will be offered on the ESJC campus.**

Q: *How will I know the dates, times, and locations of the classes?*

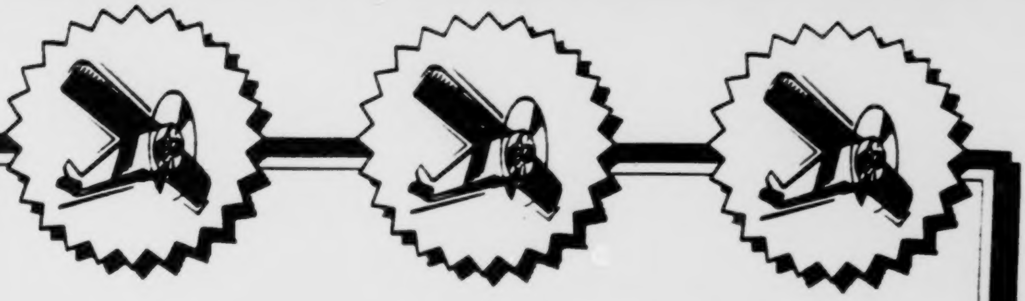
A: **On Monday February 28, your supervisor will distribute sealed envelopes that contain specific instructions.**

Q: *What do I need to do if I have a question about class assignments?*

A: **Project staff members will be on-site to answer your questions.**

Q: *What do I need to bring to class on the first day?*

A: **A notebook and pencil or pen.**



Just A Reminder

GED PRACTICE TEST

MONDAY, MAY 16

3:30 p.m.

COME TO BREAK ROOM #1

WORKFORCE 2000 PARTNERSHIP

EDUCATION

THE KEY TO OUR SUCCESS

Build and Enhance Job Skills

- Update reading, writing, and math skills
- Earn GED Certificate
- Increase opportunity for career advancement
- Build supervisory skills

Information and Sign-Up Meetings Feb. 1 and 2

English as Second Language Class

Begins April 6
3:30 p.m.
Break Room #1

SCHOOL NEWS

WORKFORCE 2000 PARTNERSHIP

Clinton Mills

December 3, 1993

Happy Holidays

Many thanks to the Education Committee for hosting the Workforce 2000 Awards Ceremony on November 4. Approximately one hundred associates and project personnel assembled to celebrate the accomplishments of the program participants. Sixty-eight associates were recognized on a plaque saluting the charter members.

Conference Room #2 has a new name. Workforce 2000 sponsored a contest challenging the students to select a new name for their classroom. The winning nomination, "Clinton's College of Knowledge", was submitted by Jimmy Brock. Jimmy received a $20 cash prize for his entry.

Congratulations to David Swedberg who recently received his GED certificate. David is a fourth shift doffer in plant #2. He completed the first twelve weeks of the Workforce Basic Skills classes in preparation for the GED test. His exam scores were high enough to earn him an academic scholarship to Enterprise State Junior College. Stop by and congratulate David on his award.

On November 15, Workforce Basic Skills classes began a new 12-week term. Monday and Wednesday classes feature Reading at 8:00 a.m., followed by Language and Writing at 2:00 and 4:00 p.m. Tuesday and Thursday classes follow the same time schedules, but focus entirely on improving Math skills. The class format has been improved to provide personalized instruction in each of the subject areas. IT'S NOT TOO LATE TO JOIN THE ASSOCIATES WHO ARE LEARNING NEW SKILLS. WE HAVE OPENINGS IN EACH OF THESE CLASSES. CONTACT GENA HOLLEY OR LINDA WILSON IF YOU ARE INTERESTED IN ENROLLING IN THE PROGRAM.

New sessions of the Workforce Communication class will begin on January 4, 1994. This course is designed to improve the verbal, written, and nonverbal communications techniques of associates and first-line supervisors. In response to your requests, we plan to offer two sessions of the class: 8-10 a.m. and 2-4 p.m. on Tuesday and Thursday. Contact Linda Wilson if you would like additional information regarding the course.

Worceforce 2000 classes will vacate for Christmas Holidays on December 16 at 6:00 p.m. Classes will resume on January 3, 1994. Gena, Kim, Beth, and Linda wish you a safe and happy holiday season.

WORKFORCE 2000 PARTNERSHIP

WORKFORCE TIMES

Pridecraft Enterprises

May 17, 1994

Photo by Calhoun

Jacquetta Hart earns GED

Jacquetta Hart recently received good news. She learned last week that she had scored high enough on the GED test to earn her certificate. Jacquetta had studied in Ms. Logan's GED prep class at ESJC last summer, prior to beginning work as a serger at Pridecraft. "I had not made any real commitment to take the GED test until I interviewed and tested under the Workforce 2000 Project", she admitted. Ms. Logan's class helped her refresh her language and writing skills. Jacquetta is an avid reader. She believes that her nightly reading has also helped to strengthen her essay writing skills and improve her test score. As if the challenge of being a working mother with three children were not enough, Jacquetta plans to enroll in Enterprise State Junior College this fall. "I want to be a fourth grade teacher". She credits her fourth and fifth grade teachers with her love for school. In response to the question of how things have changed for her as a result of earning her GED certificate, she replied "I feel more confident now; I can start to reach my goals". As an additional reward, Pridecraft will present Jacquetta with a fifty dollar savings bond for earning her GED certificate.

" I feel more confident now; I can start to reach my goals."

50 PLUS Party

Workforce 2000 staff members wish to express our thanks to Pridecraft for hosting the pizza luncheon on April 29. Pizza Hut delivered 15 large delicious pizzas for students who had attended at least 50% of their Workforce classes. Among those who helped to serve pizza were Dr.Mary Bauer, Workforce Project Director, and Richard Amason, Pridecraft's Director of Engineering. Thirty-eight students were recognized for their work in the program. The instructors wish to thank those who have maintained over 50% attendance in their classes. Our desire is to help each student attain a stronger educational foundation. This will be very important in the work environment of the future. Additional activites are being planned to celebrate the successes of our students. Plan to join us in the Workforce 2000 educational program. We are helping to train the workforce for the twenty-first century.

Computer News

Pridecraft recently purchased a new Compaq computer for use in the Workforce 2000 program. One of the software packages, TEXTDISC, teaches reading and math skills in a textile-related format. The program was designed in the North Carolina State University's School of Textile Engineering. ESJC is field-testing the program in its Workforce project at Pridecraft and Clinton Mills. Within the TEXTDISC program, there are nine reading modules that allow students to select activities from a variety of textile industries such as cutting and sewing, automobile upholstery, and cotton manufacturing. Students can choose from four topics in Math: decimals, whole numbers, fractions, and percentages. Within these areas, there are four levels of difficulty. The program is very user-friendly. After keying in a personal code, participants can easily follow directions on the screen in order to solve math problems and enhance reading skills.

ADULT LEARNER PROFILE

The Adult Learner

- has a well-developed personal identity
- carries a wealth of personal experiences which are learning resources
- studies to improve performance in other social roles, such as parenting and work
- believes that education will be helpful
- expects that class time will be well spent
- may feel insecure about his/her own ability
- may feel embarrassed about returning to school

WF 2000 UNDERSTANDS THE ADULT LEARNER

INSTRUCTOR'S NOTEBOOK

Get involved! Classes are still going on, and they are better than ever! GED preparation skills are being emphasized in math classes. This not only prepares students to earn a GED certificate, but also challenges those who need a review of upper-level math skills to include Algebra and Geometry. Math skills are used on the job each day. We are here to provide a better understanding of those concepts that will make your job easier. We encourage you to talk to someone who is attending the classes, and make plans to attend also.

ED* __ CATION

Something is missing when *U are not here!
We hope to see you in our next class.

Just For Practice

Workforce 2000 interviewees who indicated a desire to receive a GED certificate were contacted by staff membrs last week regarding a GED Practice Test session. The exam is given free of charge, and is a good indicator of one's abilitiy to pass the official GED test. At this point, eleven Workforce participants have successfully completed the practice test prior to taking the official exam. If you did not graduate from high school and want to earn a GED certificate, notify one of the instructors, or contact Linda Wilson to set up a test date. You may qualify immediately for the official GED test. If not, your practice test results will be analyzed to provide an indication of skills that we can help you to master prior to taking the official test.

ESJC Summer Orientation College Credit Courses

Enterprise Campus

Session 1		
Day 1:	Friday, July 8th	7:45 a.m.-4:00 p.m.
Day 2:	Friday, July 15th	7:45 a.m.-11:30 a.m.
Session 2		
Night 1:	Monday, July 18th	3:30 p.m.-8:30 p.m.
Night 2:	Thursday, July 21st	4:30 p.m.-8:30 p.m.
Session 3		
Day 1:	Friday, July 29th	7:45 a.m.-4:00 p.m.
Day 2:	Friday, August 5th	7:45 a.m.-11:30 a.m.
Session 4		
Day 1:	Friday, August 12th	7:45 a.m.-4:00 p.m.
Day 2:	Thursday, August 18th	12 noon-4:00 p.m.

The ASS[illegible] Test will be given during each session from 1:00 p.m. to 4:00 p.m., with the exception of session 2. Test times for session 2 will be from 5:30 p.m. to 8:30 p.m. Tuition for the course is $22 and $8 for lunch/activity fee.

For more information call Betty Cully 393-ESJC, ext. 304

[illegible] Next Issue [illegible]

Send us your choice of a WF 2000 participant for the Student Spotlight section.

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Pridecraft Enterprises Offers Education for its Employees Through Workforce 2000

GEORGIANA

By Gladys Crenshaw

"Education, the key to our success," is the slogan for the Workforce 2000 Partnership that has formed between Workforce 2000, Pridecraft Enterprise, Douglass MacArthur Technical College and Enterprise State Junior College. This partnership exists to promote education in the workplace.

The key purpose of Workforce 2000 is to offer improvement, increase advancement potential, prepare for GED, update reading, writing, and math skills at no added cost to the employees. Phillip Johnson, counselor, instructor and assistant director of Workforce 2000 and Mary Cross, instructor from MacArthur Tech, came to the Georgiana facility twice weekly after scheduled working hours to instruct and assist employees with their work. Each employee is allowed to work at their own pace and know that Phillip and Mary are there if they have any problems. The partnership has been accepted very well here at the Georgiana facility.

Phillip Johnson and MacArthur Tech have worked with the Georgiana facility in the past and are very glad that with Workforce 2000 Partnership, the program can be offered to any Pridecraft employee who wishes to participate in it. Pridecraft is also offering a '50^{00}' savings bond to any employee who successfully receives their GED between February 1, 1994 and December 31, 1994.

We hope that this partnership will be renewed in July 1994 so that every employee who wishes to may continue to benefit from this partnership.

Remember "Education – something no one can take away".

ENTERPRISE

By Peggy Cunningham, Workforce Instructor

The Workforce 2000 English program at Pridecraft has been a success for the first quarter. It has given the workers a chance to improve their English skills and feel better about themselves. Two different classes are currently being offered.

One class is for workers who would like to strengthen their skills in reading, writing, or speaking. The goals of the students are varied. Some would like to prepare themselves for the GED test while others would like to advance within the company, or just improve themselves. Some have worked very hard with reading skills so that they could better understand and interpret the rules and regulations connected with their jobs.

The second class was the English as a second language class. This class was for the workers who spoke or read little English. In this class, the students had to practice and practice pronouncing words and writing words. Lessons were built around the words used at work or words used in the context of everyday life. Learning a new language is not an easy task and can certainly be very discouraging at times, but these workers have truly been motivated and interested in learning English.

Each student has shown improvement in some area. They should all be commended for a job well done. All have worked very hard and attended the class after work when they were very tired.

JACQUETTA HART EARNS GED

Jacquetta Hart recently received good news. She recently learned that she had scored high enough on the GED test to earn her certificate. Jacquetta had studied in Ms. Logan's GED prep class at ESJC last summer, prior to beginning work as a serger at Pridecraft in Enterprise. "I had not made any real commitment to take the GED test until I interviewed and tested under the Workforce 2000 Project", she admitted. Ms. Logan's class helped her refresh her language and writing skills. Jacquetta is an avid reader. She believes that her nightly reading has also helped to strengthen her essay writing skills and improve her test score. As if the challenge of being a working mother with three children were not enough, Jacquetta plans to enroll in Enterprise State Junior College this fall. "I want to be a fourth grade teacher." She credits her fourth and fifth grade teachers with her love for school. In response to the question of how things have changed for her as a result of earning her GED certificate, she replied "I feel more confident now; I can start to reach my goals." As an additional reward, Pridecraft will present Jacquetta with a fifty dollar savings bond for earning her GED certificate.

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Appendix C

Sample Instructional Modules

MODULE: Measurement and Numerical Skills

JG

GENERAL INSTRUCTIONAL OBJECTIVE: Understand Occupational Specific Use of Mathematical Symbols

JOB TITLE: Sewing Machine Operator

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
III.B.100 Upon completion, the student will be able to interpret and apply ratios and proportions.	B.1.1 Motivational Activity Using the number of students in the class, write ratios; ex. number of men to number of women, number of men to total number of students, etc.	Attachment B.1.1	Teacher evaluation through observation and discussion.
	B.1.2 Pre-test Have students take pre-test to evaluate student needs.	Attachment B.1.2 Teacher made pre-test	10 item Pre-test
	B.1.3 Teach Vocabulary	Attachment B.1.3	
	B.1.4 Instructional Activity: Lecture on reading and writing ratios. Use practice sheet for guided practice. Check and discuss.	Attachment B.1.4 B.1.4p	Observation
	B.1.5 Instructional Activity: Lecture on rate as a per unit rate. Discuss examples with students.	Attachment B.1.5 Additional practice, Number Sense Ratio and Proportion pp. 16-20	Observation

B.1.6 Instructional Activity: Using a workplace example, discuss proportions and the meaning of their products to solve a problem. Assign practice sheet and discuss upon completion.	Attachment B.1.6 Attachment B.1.6p (practice sheet)	Observation
B.1.7 Culminating Activity: Have students measure with a yard stick several objects; door, window, table, etc. Then use a book and scaled drawing of a rectangle to show proportions. Draw proportions of objects in pairs. Discuss.	Attachment B.1.7 Yardstick, book, scaled drawing of a rectangle to a book.	Observation
B.1.8 Post-test Administer Post-test for student evaluation	Attachment B.1.8 (Teacher made post-test)	10 item Post-test

WORKPLACE LESSON PLAN

Job Title: Sewing Machine Operator

Module: Math

General Instructionl Objective: Utilize Occupational Specific Math.

Specific Instructional Objective: Upon completion, the student will be able to interpret and apply ratios and proportions.

MOTIVATIONAL ACTIVITY:

Using the number of students in the class, write ratios; ex. number of men to number of women, number of men to total number of student, etc.

PRE-TEST ON Ratio and Proportion

PRE-TEACH VOCABULARY

INSTRUCTIONAL ACTIVITIES:

Lecture on reading and writing ratios. Use practice sheet for guided practice. Check and discuss.

Lecture on rate as a per unit rate. Discuss examples with students.

Using a workplace example, discuss proportions and the meaning of their products to solve a problem. Assign practice sheet and discuss upon completion.

CULMINATING ACTIVITY:

Have students measure with a yard stick several objects; door, window, table, etc. Then use a book and scaled drawing of a rectangle to show proportions. Draw proportions of objects in pairs. Discuss.

POST-TEST - Evaluate to determine if review is necessary.

(B.1.1.)

MOTIVATIONAL ACTIVITY: Class Ratios

Have students use the number of students in class to write ratios:

Examples:

1. Number of men to number of women.
2. Number of women to mumber of men.
3. Number of men to total number of students in the class.
4. Number of students with brown eyes to the total number of students.
5. Number of cutters to total number of students.
6. Number of sewing machine operators to total number of students.

(B.1.2)

PRE-TEST

RATIO AND PROPORTION

Write each ratio as a fraction in lowest terms.

1. 8 out of 11
2. 14 out of 18
3. 15:25
4. 36 is to 48
5. For every bundle of lab pants sewn, 2 are returned for corrections.

Compare. Write = or ≠

6. 3/4 _____ 9/12
7. 4/5 _____ 5/6
8. 42/35 _____ 36/30

Write as ratios. Are they equal? Write yes or no.

9. 6 out of 7 days

   7 out of 8 days

10. 3 seconds out of 25

    4 seconds out of 30

(B.1.2)

ANSWER KEY

1. 8/11
2. 7/9
3. 3/5
4. 3/4
5. 1/25
6. =
7. ≠
8. =
9. 6/7, 7/8, no
10. 3/25, 4/30, no

(B.1.3)

VOCABULARY

Ratio - a relation comparing one quantity to another by division (ratios compare measurements which may or may not be of the same kind).

Porportion - a statement that two ratios are equal.

Rate - a ratio that compares quantities in different units. (rates cannot be of the same kind)
Ex.: 10 hours to 2 hours is a ratio but not a rate, and 10 miles to 2 hours is both a ratio and a rate.

Terms - the numbers in a proportion.

$$\begin{array}{rcccl} \text{1st term} \;{-}{-}{-}{>} & \underline{1} & = & \underline{4} & {<}{-}{-}{-}\; \text{3rd term} \\ \text{2nd term} \;{-}{-}{-}{>} & 2 & & 8 & {<}{-}{-}{-}\; \text{4th term} \end{array}$$

Means - the second and third terms of a proportion.

Extremes - the first and fourth terms of a proportion.

Cross-product - to multiply the means and the extremes and set them equal.

(B.1.4)

READING/WRITING RATIOS

A ratio is a quotient of two numbers that is used to compare one quantity to another.

A sewing team completed 8 gowns out of 12 gowns. The ratio of completed gowns to total gowns is:

8 to 12 8:12 8/12

All three are read eight to twelve. Since 8/12 = 2/3, the ratio of 8 to 12 is the same as 2 to 3, so 8:12 = 2:3.

Write the following as ratios in 3 ways and in lowest terms.

EX. 1) 2 teachers worked with 30 students.

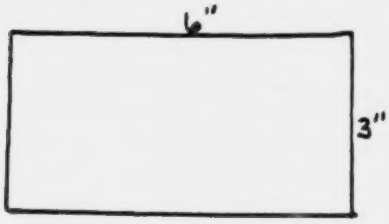
2:30 2 to 30 2/30 (2/30 = 1/15)

EX. 2) The company provided 8 computers for 64 students.

8:64 8 to 64 8/64 (8/64 = 1/8)

In the figure at right the relation of the length of the two sides is 6 inches to 3 inches. Write the ratio in 3 ways.

6 to 3 6:3 6/3

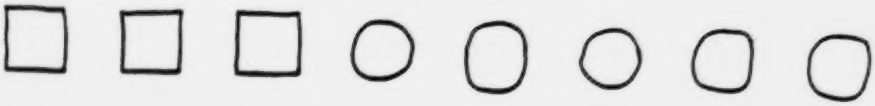


(Draw on the board)

(B.1.4p)

WRITE THE RATIOS

PRACTICE



Using the drawings, write three forms of ratios for each problem.

1. **Number of circles to the total number of figures.**
2. **Total number of figures to circles.**
3. **Number of squares to number of circles.**
4. **Number of squares to total number of figures.**
5. **Number of circles to number of squares.**

Write the given ratio as a fraction and simplify.

4 to 12 = $\frac{4}{12}$ = ___

simplify

7. 12 : 15 = _____ = ______

8. 15 to 30 = ______ = ______

9. 11 to 22 = ______ = ______

10. 7 : 49 = ______ = ______

(B.1.4p)

WRITE THE RATIOS

ANSWER KEY

1. 5 to 8, 5:8, 5/8
2. 8 to 5, 8:5, 8/15
3. 3 to 5, 3:5, 3/5
4. 3 to 8, 3:8, 3/8
5. 5 to 3, 5:3, 5/3
6. 1/3
7. 12/15 = 4/5
8. 15/30 = 1/2
9. 11/22 = 1/2
10. 7/49 = 1/7

(B.1.5)

RATE

A *rate* is a ratio that is used to compare quantities of different kinds. Rates are usually written in a per unit form, that is as a ratio of a quantity to 1, called the *unit rate.*

Suppose a stitcher is paid \$54.90 for 366 pockets. You can find the unit rate by dividing the amount paid by the number of pockets.

$$\frac{\text{amount paid}}{\text{pockets}} = \frac{\$54.90}{366} = \frac{\$.15}{1}$$

Have students complete the following:

a. $\frac{40}{8} = \frac{(5)}{1}$ b. $\frac{75}{15} = \frac{(5)}{1}$ c. $\frac{810}{90} = \frac{(9)}{1}$

Express as a unit rate: 20 miles in 5 hours (4 mi/hr)

(Additional practice: *Number Sense* *Ratio and Proportion* pp.16-20)

(B.1.6)

PROPORTIONS

A sewing associate inserts 4 sleeves in 3 minutes. At this rate, how many sleeves does she insert in 45 minutes?

You can write a proportion to describe the situation and solve the problem.

Let X = the number of sleeves in 45 minutes.
What you are trying to find.)

$\frac{4}{3} = \frac{X}{45}$ <--- number of sleeves
<--- number of minutes

In a proportion, the product of the means equals the product of the extremes.

This is called the cross-product.

Multiply the means $3 \cdot x$

Multiply the extremes $4 \cdot 45$

Set them equal $3X = 4 \cdot 45$

Divide both sides by 3 $\frac{3X}{3} = \frac{180}{3}$

$X = 60$

A sewing associate inserts 60 sleeves in 45 minutes.

Is $\frac{8}{10} = \frac{12}{15}$ a proportion?

$10 \cdot 12 = 8 \cdot 15$
$120 = 120$ yes

If the cross products are not equal it is not a proportion.

Use this method to solve the following proportions with students.

a. $\frac{2}{7} = \frac{n}{21}$ (n=6)

b. $\frac{X}{7} = \frac{10}{35}$ (X = 2)

c. 1 is to 3 as 2 is to X (1:3 = 2:X; X = 6)
1/3 = 2/X

d. 2 is to x as 4 is to 9 (2:X = 4:9; X = 4.5)
2/X = 4/9

(B.1.6p)

PROPORTIONS

PRACTICE

Write true if the pair of numbers makes a proportion and false if it does not.

1. $\frac{1}{2}$ $\frac{5}{11}$ 2. $\frac{14}{16}$, $\frac{21}{24}$ 3. $\frac{36}{200}$, $\frac{18}{100}$

4. $\frac{1}{5}$, $\frac{20}{100}$ 5. $\frac{27}{50}$, $\frac{55}{100}$ 6. $\frac{21}{52}$, $\frac{42}{104}$

Find the missing term, and check your answer.

7. $\frac{5}{9} = \frac{X}{27}$ 8. $\frac{4}{7} = \frac{28}{X}$ 9. $\frac{n}{15} = \frac{1}{3}$

10. $\frac{18}{X} = \frac{22}{99}$ 11. $\frac{7}{10} = \frac{70}{a}$ 12. $\frac{n}{72} = \frac{5.1}{8}$

Problem Solving: Use a proportion to solve.

13. Ronnie is paid $15 for 2 hr. of work. At this rate, how much will he earn in 10 hr.?

14. Mary add elastic to 8 bedsheets in 4.2 minutes. How many sheets will she finish in 21 minutes?

15. John bundles the bal counts in bundles of 48. Each bundle weighs 23.73 pounds. What will the total weight of 576 lab coats be?

(B.1.6p)

PROPORTIONS

ANSWER KEY

1. F
2. T
3. T
4. T
5. F
6. T
7. $X = 15$
8. $X = 49$
9. $n = 5$
10. $X = 81$
11. $a = 100$
12. $n = 45.9$
13. $\frac{15}{2} = \frac{X}{10}$; $X = \$75$
14. $\frac{8}{4.2} = \frac{X}{21}$; $X = 40$
15. $\frac{48}{23.73} = \frac{576}{X}$ or $\frac{1}{23.73} = \frac{12}{X}$ $X = 284.76$

(B.1.7)

CULMINATING ACTIVITY

PROPORTION SCALE DRAWING

Draw several line segments on the board and have students measure them with a yard stick.

Stress accuracy in reading the measurement. Then have students measure several objects in the classroom. Include tables, door, window, file cabinets.

Using ratio and proportion, you can draw large objects into small pictures.

Use a book and a scaled drawing of a rectangle. Have students examine the rectangle and compare its dimensions to the book. What is the ratio of the width of the book to the width of the rectangle? ____ : ____ . The length of the book to the length of the rectangle? _____ : _____
Are the ratios equal?
If yes, it is a (scale drawing) of the book.

Have them work in pairs to draw a scale drawing of something rectanglar.

(B.1.8)

POST-TEST

RATIO AND PROPORTION

Express each ratio in lowest terms.

1. a. 15:5 b. 25:10 c. 12:4

d. 3/4 : 1/4 e. 25:75

Write the unit rate.

2. 360 for $61.20

3. $25.95 for 30

Write as many proportion as you can using all four numbers.

4. 4, 7, 12, 21

5. 1, 3, 5, 15

Solve for the variable using means and extremes. (cross-product)

6. $\frac{a}{7} = \frac{10}{12}$ 7. $\frac{25}{c} = \frac{75}{90}$ 8. $\frac{0.8}{0.4} = \frac{1.2}{d}$

9. It takes an experienced pocket stitcher 7.32 minutes to stitch 48 pockets. It takes a beginnier 21.96 minutes to complete the same task. What is the ratio of the first stitcher's time to the second stitcher's time?

10. The company sold 10,800 fitted sheets last year. How many bundles of sheets did the company sell if there are 48 sheets in a bundle? Write a proportion and solve.

(B.1.8)

POST-TEST

ANSWER KEY

1. a. 3:1
   b. 5:2
   c. 3:1
   d. 3:1
   e. 1:3

2. $17

3. $.865

4. 4:7 = 12:21
   4:12 = 7:21
   7:4 = 21:12
   12:4 = 21:7

5. 1:3 = 5:15
   1:5 = 3:15
   3:1 = 15:5

6. $\underline{a} = \underline{10}$ 7. $\underline{25} = \underline{75}$ 8. $\underline{0.8} = \underline{1.2}$

6. a = 35

7. c = 30

8. d = 0.6

9. 1:3

10. $\frac{b}{10,800} = \frac{1}{48}$ b = 225

MODULE: Workplace Skills for Textile Supervisors

GENERAL INSTRUCTIONAL OBJECTIVE: Motivating for Productivity **JOB TITLE:** Supervisor

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
VIII.300 Explore some of the classical theories of worker motivation and how those theories are are challenged by changes in employee attitudes and work ethics.	3.4.1 Discuss changes in the work ethic. Compare supervisor motivators to subordinate motivators.		Pretest. Observation to determine awareness of topic.
	3.4.2 Work activity "What Are Your Assumptions About Your Coworkers?" Discuss McGregor's Theory X and Theory Y.	Activity: "What Are Your Assumptions About Your Coworkers?" Paul R. Trimm & Brent D. Peterson, People at Work: Human Relations in Organizations (St. Paul, MN: West Publishing, 1993), pp. 148-149.	
	3.4.3 Outline Maslow's hierarchy of needs. Work Activity "Where Are You on the Ladder?"	Activity: Where Are You on the Ladder?" Twyla Dell, An Honest Day's Work (Los Altos, Calif: Crisp Publications, 1988), p. 12.	
	3.4.4 Discuss B.F. Skinner's behavior modification. Give workplace examples.		
	3.4.5 Characterize each need in David McClelland's theory regarding achievement, affiliation, and power. Discuss how each might influence productivity.	Handout: "David McClelland's Theory of Motivation."	

3.4.6 Outline Fredrick Herzberg's hygiene factors and motivators. Compare to Maslow's hierarchy. Discussion: Satisfaction vs. Motivation.	Handout: "Theories of Motivation: Maslow vs. Herzberg."	
3.4.7 Small group discussion and presentation of Dr. Deming's points and application to the textile industry.	Handout: "Dr. Edward Deming's Fourteen Management Principles"	
3.4.8 List and rank motivating factors for subordinates. Have subordinates rank. Discuss ways of using results for increasing productivity.		Post-test. Application of theories addressed.
3.4.9 Conclude with a discussion of what workers want in the '90s compared with the '70s and '80s.	"Another Look: Dusting Off the '60s in the '90s", Paul R. Trimm & Brent D. Peterson, People at Work: Human Relations in Organizations (St. Paul, MN: West Publishing, 1993), p.62.	

Job Title: Supervisor

Module: Workplace Skills for Textile Supervisors

General Instructional Objective: Motivating for Productivity

Specific Instructional Objective: Explore some of the classical theories of worker motivation and how those theories are challenged by changes in employee attitudes and work ethics.

MOTIVATING FOR PRODUCTIVITY

MOTIVATIONAL ACTIVITY

3.4.1 - Lead discussion on how the work ethic has changed over the years. Have participants think of the five (5) things that motivate them most. Write these down. Then have them list the five (5) things that motivate their associates most. Discuss the commonalities and the differences in their two lists.

INSTRUCTIONAL ACTIVITIES

3.4.2 - Work activity "What Are Your Assumption About Your Coworkers?" After completion and scoring, use this acitivity as the basis for a discussion of McGregor's Theory X and Theory Y.

3.4.3 - Outline Maslow's hierarchy of needs. After explanation of each level, have participants place themselves on the hierarchy. Also, have them place a number of their subordinates on the hierarchy. Are the needs similar or different? Activity: "Where Are You on the Ladder?"

3.4.4 - Discuss B. F. Skinner's behavior modification. Ask participants to give workplace examples.

3.4.5 - Discuss David McClelland's theory regarding achievement, affiliation, and power. Characterize individuals driven by each of these needs. Looking at each need separately, discuss how each might serve as a workplace motivator and influence productivity.

3.4.6 - Outline Fredrick Herzberg's hygiene (maintenance) factors and motivators. Discussion: Are satisfaction and motivation the same things, or are they different? Compare to Maslow's hierachy.

3.4.7 - Break into small groups. Assign each group several of Deming's points. Discuss significance and application of each to the textile industry. Have each group share an overview of each of their points with entire group. Discuss weakness related to each point from each area, carding, spinning, weaving, inspecting, etc.

3.4.8 - Have each supervisor to again consider his/her workers. Develop a list of 8 to 10 motivating factors that his/her workers would relate to. Have each supervisor rank these items as he/she feels they are of importance to workers. Challenge supervisors to have their workers do the same ranking. Compare results. Discuss how these results might be used to develop strategy for increasing productivity.

3.4.9 - Conclude with a discussion of what workers want in the 90s compared with the 70s and 80s. (More time off)

ACTIVITY: WHAT ARE YOUR ASSUMPTIONS ABOUT YOUR COWORKERS?

This instrument is designed to help you better understand the assumptions you make about people and human nature. There are ten pairs of statements. Assign a weight from 0 to 10 to each statement to show the relative strength of your belief in the statements in each pair. The points assigned for each pair must total 10. Be as honest with yourself as you can, and resist the natural tendency to respond as you would "like to think things are." This instrument is not a test. There are no right or wrong answers. It is designed to be a stimulus for personal reflection and discussion.

1. (a)____ It's only human nature for people to do as little work as they can get away with.

   (b)____ 10 When people avoid work, it's usually because their work has been deprived of its meaning.

2. (c)____ If employees have access to any information they want, they tend to have better attitudes and behave more responsibly.

   (d)____ 10 If employees have access to more information than they need to do their immediate tasks, they will usually misuse it.

3. (e)____ One problem in asking for the ideas of employees is that their perspective is too limited for their suggestions to be of much practical value.

   (f)____ 10 Asking employees for their ideas broadens their perspective and results in the development of useful suggestions.

4. (g)____ If people don't use much imagination and ingenuity on the job, it's probably because relatively few people have much of either.

   (h)____ 10 Most people are imaginative and creative but may not show it because of limitations imposed by supervision and the job.

5. (i)____ People tend to raise their standards if they are accountable for their own behavior and for correcting their own mistakes.

   (j)____ 10 People tend to lower their standards if they are not punished for their misbehavior and mistakes.

6. (k)____ It's better to give people both good and bad news, because most employees want the whole story, no matter how painful.

(l)____ It's better to withhold unfavorable news about business, because most employees really want to hear only the good news.
10

7. (m)____ Because a supervisor is entitled to more respect than those below him or her in the organization, it weakens his or her prestige to admit that a subordinate was right and he or she was wrong.

(n)____ Because people at all levels are entitled to equal respect, a supervisor's prestige is increased when he or she supports this principle by admitting that a subordinate was right and she or he was wrong.
10

8. (o)____ If you give people enough money, they are less likely to be concerned with such intangibles as responsibility and recognition.

(p)____ If you give people interesting and challenging work, they are less likely to complain about such things as pay and supplemental benefits.
10

9. (q)____ If people are allowed to set their own goals and standards of performance, they tend to set them higher than the boss would.

(r)____ If people are allowed to set their own goals and standards of performance, they tend to set them lower than the boss would.
10

10. (s)____ The more knowledge and freedom a person has regarding his or her job, the more controls are needed to keep him or her in line.

(t)____ The more knowledge and freedom a person has regarding his or her job, the fewer controls are needed to ensure satisfactory job performance.
10

Now add up the points you assigned as follows. The higher score reflects your predominant orientation.

Theory X score = Sum of a, d, e, g, j, l, m, o, r, and s.

Theory Y score = Sum of b, c, f, h, i, k, n, p, q, and t.

(a)____

(d)____

(e)____

(g)____

(j)____

(l)____

(m)____

(o)____

(r)____

(s)____

Theory X
score = _____

(b)____

(c)____

(f)____

(h)____

(i)____

(k)____

(n)____

(p)____

(q)____

(t)____

Theory Y
score = _____

SOURCE: Paul R. Trimm & Brent D. Peterson, People at Work: Human Relations in Organizations (St. Paul, MN: West Publishing, 1993), pp 148-49.

DOUGLAS MCGREGOR'S THEORY X AND THEORY Y

Theory X Assumptions

1. Work is inherently distasteful to most people.
2. Most people are not ambitious, have little desire for responsibility, and prefer to be directed.
3. Most people have little capacity for creativity in solving organizational problems.
4. Motivation occurs only at what Maslow called the survival and security levels.
5. Most people must be closely controlled and often coerced to achieve organizational objectives.

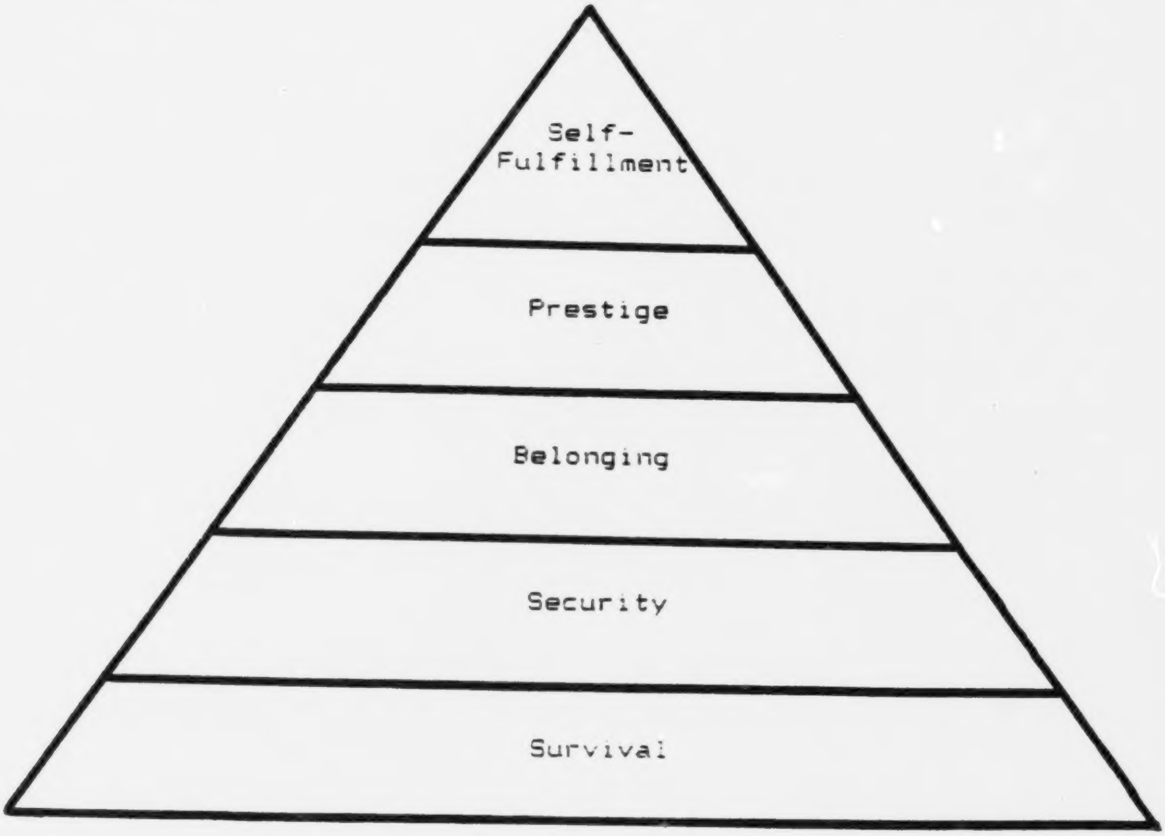
Theory Y Assumptions

1. Work is as natural as play, if the conditions are favorable.
2. Self-control of the individual is often indispensable in achieving organizational goals.
3. The capacity for creativity in solving an organization's problems is widely distributed throughout the organization.
4. Motivation occurs at the belonging, prestige, and self-fulfillment levels, as well as the survival and security levels.
5. People can be self-directed and creative at work if properly motivated.

ACTIVITY: WHERE ARE YOU ON THE LADDER?

Maslow's hierarchy of needs shows that all humans have the same basic needs. How do these needs get satisfied in the average job? Put an X on the level where you think you spend most of your time. Are you at the survival level or closer to self-fulfillment? Or do you (like most people) operate mostly in the security or prestige levels?

Look again at the triangle. Circle your X and then place new Xs with the initials of others you work with where you think they fit.



SOURCE: Twyla Dell. *An Honest Day's Work* (Los Altos, Calif: Crisp Publications, 1988), p. 12.

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DAVID MCCLELLAND'S THEORY OF MOTIVATION

1. Need of Achievement

   Characteristics:

   a) Achievement-motivated people gain satisfaction from the accomplishment itself.

   b) They prefer to work on a problem, rather than leave the outcome to chance.

   c) They appreciate receiving concrete feedback.

   d) They are more likely to come from families where parents held high expectations for their children.

2. Need for Affiliation

   Characteristics:

   a) They tend to conform to what they believe other people want from them.

   b) They seek the company of others.

   c) They take steps to be liked by others.

3. Need for Power

   Characteristics:

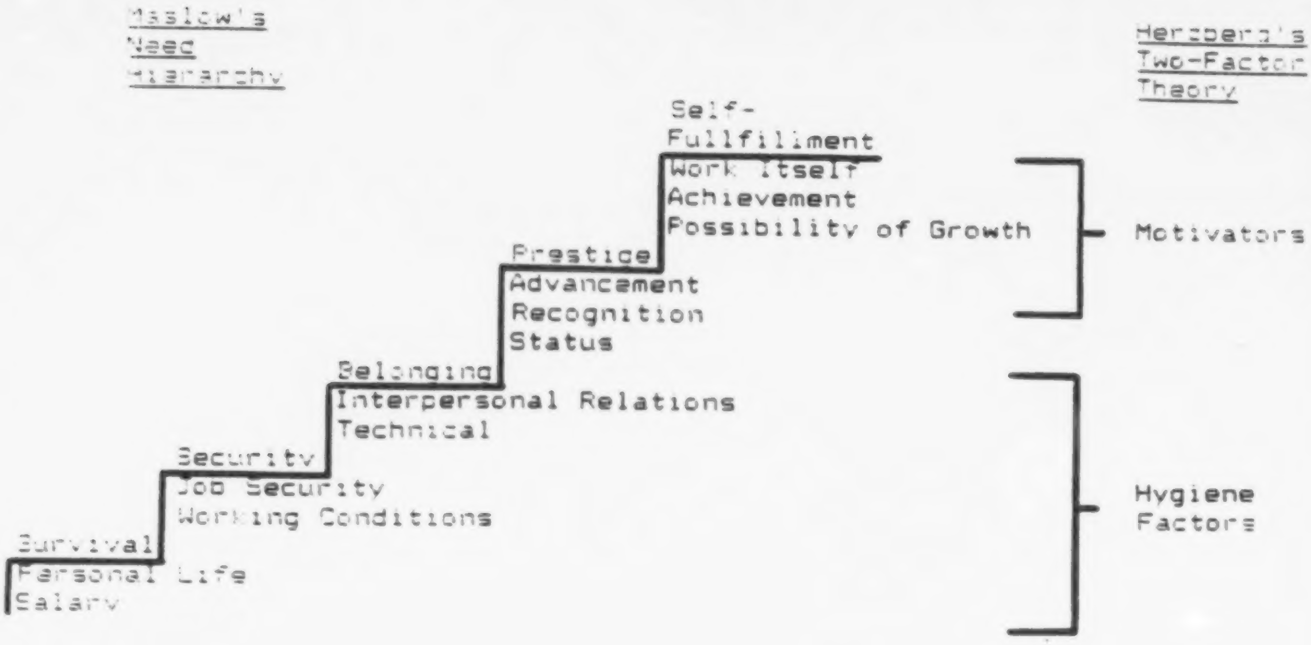
   a) They tend to try to prevail in every situation.

   b) They may be persuasive and inspirational.

   c) They may display a high level of self-confidence.

THEORIES OF MOTIVATION

Maslow vs. Herzberg


Maslow's
Need
Hierarchy
Herzberg's
Two-Factor
Theory
Self-
Fullfiliment
Work Itself
Achievement
Possibility of Growth
Motivators
Prestige
Advancement
Recognition
Status
Belonging
Interpersonal Relations
Technical
Security
Job Security
Working Conditions
Hygiene
Factors
Survival
Personal Life
Salary

Herzberg suggests survival, security, belonging, and to some degree, prestige needs can be satisfied with hygiene factors. The remainder of prestige needs and self-fulfillment needs can be satisfied with motivators.

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MODULE: Success Skills for Textile Industry **JOB TITLE:** Hourly textile employees

GENERAL INSTRUCTIONAL OBJECTIVE: Teamwork and Problem Solving

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
IX.E.100.			
1. Identify what a team is	Discussion	What is a Team? handout	Pre/post assessment
2. Discuss differences between being a part of a group and a member of a team	Discussion	"Groups Versus Teams" Team Building; An Exercise in Leadership p. 5	
3. Discuss how to work effectively as team members	Video Discussion	Video The Changing Work Place	
4. Discuss what can make a team successful	Discussion	"What Could Make a Team Fail?" What is a Team? handout	
5. Discuss what can make a team successful	Discussion	"What Could Make a Team Fail?" What is a Team? handout	
6. Identify traits of good teamwork	Discussion	"What Could Make a Team Fail?" What is a Team? handout	
7. Identify key skills and tools which make a team work	Discussion	"What Could Make a Team Fail?" What is a Team? handout	
8. Define problem	Acronym display, Discussion	What Are Problems? transparency	
9. Explain the role of problem-solving in the contemporary workplace	View video Discussion	Video The Changing Workplace	
10. Identify steps of problem-solving	Instructor presentation Reading	Contemporary's Reading Skills That Work pp. 106-112	
11. Utilize a learning styles inventory to maximize team efforts	Complete inventory and analyze results	Help Yourself pp. 13-24	

MODULE: Success Skills for Textile Industry

GENERAL INSTRUCTIONAL OBJECTIVE: Teamwork and Problem Solving.

Motivational Activity

Instructor will present the "Lost On the Moon" scenario (p. 19 Workplace Readiness Teamwork Unit, 1992, Agency for Instructional Technology, Bloomington). Participants will list each item, then rank individually. Participants will then form a team (or teams) and rank items. Instructor will then present NASA's ranking (p. 126). It is likely that the group ranking will be closer to the NASA ranking, demonstrating that if a team is functioning well, its efforts will be more effective than an individual effort. Instructor will explain that just as the "moon travelers" were dependent on effective teamwork skills for survival, industrial employees are dependent on effective teamwork for survival in a global marketplace. This seminar will help participants utilize effective problem solving skills as effective team members.

Assessment Activity

Instructor will distribute preview. After completion, participants will return preview to instructor for scoring.

Learning Activities

1. Instructor will distribute handout What is a Team? and will lead participants in a discussion of its components.
2. Instructor will distribute copies of Team Building: An Exercise in Leadership (from Crisp Publications) and ask participants to compare and contrast groups vs. teams. Instructor will ask participants to categorize their "moon team" as either a team or group, based on how they accomplished their purpose.
3. Instructor will show video portraying how to work effectively as team members (MacArthur Technical College instructors use The Changing Workplace: Teamwork, available from Agency for Instructional Technology). Instructor will lead participants in a discussion of the video contents.
4. Instructor will ask participants to look at "What Could Make a Team Fail?" in the What is a Team? handout, and lead discussion.

5. Instructor will ask participants to look at "What Makes a Team Successful" and discuss.

6. Instructor will ask participants to look at "Traits of Good Teamwork" and discuss.

7. Instructor will ask participants to look at "Key Skills and Tools Which Make Teams Work" and discuss.

8. Instructor will explain that once participants form an effective team, they can apply the principles of teamwork to problem solving. Instructor will use the "Problem Acronym" transparency to explain what problems actually are.

9. Instructor will show a video which explains the role of problem solving in the contemporary workplace (MacArthur Technical College personnel use The Changing Workplace: Problem-Solving, available from Agency for Instructional Technology). Instructor will lead a discussion of the video's contents.

10. Instructor will distribute copies of Contemporary's Reading Skills That Work, and guide participants through explanations and activities on pages 106-112, focussing on the steps of problem-solving.

11. Instructor will explain that knowing the learning styles of an individual is helpful in both individual and team problem solving. Instructor will distribute copies of Help Yourself! (available from New Readers Press), and ask participants to complete the Learning Style Inventory, and read the accompanying interpretation explanation. Instructor will ask participant to consider their own learning styles, as well as those of team members, and examine how learning styles impact problem-solving methods.

Concluding Activity

Instructor will ask participants to re-form their team(s). Instructor will present the following scenario: A company which manufactures a particular product is having trouble in its shipping department because employees are reading the discarded newspapers which are used for packing. The company uses the newspapers because recycling is good for the environment, and the newspapers are a cost-free source of packaging. The slow-down in shipping has become a real problem, and the team must use its teamwork/problem solving skill to find a solution. After the group utilizes their skills to develop a solution, a spokesperson will announce the solution. Instructor will then give participants an opportunity to examine the effectiveness of their teamwork.

Success Skills for the Textile Industry

Team Building/Problem Solving

Preview

______ 1. Which of the following describes a team?

- a. group of individuals with different goals
- b. group of individuals with each contributing to the whole
- c. group of individuals with hidden agendas
- d. both a and c

______ 2. Which of the following represents teamwork?

- a. quarterback passes the ball to a receiver
- b. employees cooperate with supervisors to complete a task
- c. stock worker places product on shelf; salesperson helps customer select product from shelf
- d. all of the above

______ 3. Which of the following is characteristic of a group?

- a. members feel a sense of owning jobs
- b. members think they are brought together
- c. members contribute to organizations' success
- d. all of the above

______ 4. Which of the following is characteristic of a team?

- a. members focus on selves and approach job as hired hands
- b. members are told what to do
- c. members work in a climate of trust
- d. conformity appears more important than positive results

______ 5. Which is the best definition for synergy?

- a. The individual part is greater than the sum.
- b. A state of non-creativity.
- c. The individual parts are equal to their sum.
- d. The whole is greater than the sum of its parts.

______ 6. Which of the following can cause a team to succeed?

- a. everyone trying to be boss
- b. last minute changes
- c. willingness to try something new
- d. criticism of other members

Preview

______ 7. Which of the following is not a trait of good teamwork?

a. clear goals
b. desire to work independently
c. group consensus in decision making
d. high satisfaction with team success

______ 8. Which of the following statements regarding learning styles is correct?

a. an employee who learns better by reading is superior to one who learns by doing
b. manipulating is not a valuable learning style in a manufacturing environment
c. no one learning style is better than another
d. both a and b

______ 9. Which of the following statements regarding problems is true?

a. problems help mold our future
b. problems warn us about potential disasters
c. no problem is without a solution
d. all of the above

______ 10. Which of the following is not a problem solving step?

a. identify the problem
b. delegate responsibility
c. brainstorm solutions
d. reassess periodically

WHAT IS A TEAM?

- GROUP OF INDIVIDUALS
- EACH DOING A PART; CONTRIBUTING TO THE WHOLE
- ALL WORKING TO ACCOMPLISH COMMON GOALS
- WORKING TOGETHER

WHAT COULD MAKE A TEAM FAIL?

POOR COMMUNICATION

LOSING YOUR TEMPER

CRITICISM OF OTHER MEMBERS

EVERYONE TRYING TO BE THE BOSS

NOT KNOWING WHAT YOU'RE SUPPOSED TO DO

MEMBERS NOT PARTICIPATING OR CONTRIBUTING

NOT HAVING TIME TO PLAN

CONSTANTLY BEING INTERRUPTED

LAST MINUTE CHANGES

POOR COORDINATION

NOT HAVING THE RIGHT RESOURCES

NOT HEARING WHAT SOMEONE SAID

WHAT MAKES TEAMS SUCCESSFUL?

OPEN COMMUNICATION

LISTENING TO EACH OTHER

RESPECT

BEING CO-OPERATIVE

USING EACH OTHER'S KNOWLEDGE, SKILLS, OR EXPERIENCE

TRUSTING EACH OTHER

WILLING TO TRY SOMETHING NEW

UNDERSTANDING SOMEONE'S OPINION

UNDERSTANDING THE GROUP'S OBJECTIVE (HAVING A COMMON GOAL)

REVIEWING YOUR RESOURCES, MATERIALS, SKILLS

COMMON SENSE OF TIMING

BEING POLITE

EXPLAINING YOURSELF

TRYING TO ANTICIPATE PROBLEMS

HELPING SOMEONE ON THE TEAM WHO NEEDS IT

BEING OPEN TO CONSTRUCTIVE CRITICISM

WORKING TOGETHER

HAVING A LEADER (GUIDES, INITIATES, COACHES, GIVES FEEDBACK)

TAKING INDIVIDUAL RESPONSIBILITY

BEING FLEXIBLE

TRAITS OF "GOOD" TEAMWORK

- CLEAR GOALS
- AN UNDERSTANDING OF GOALS BY MEMBERS
- DESIRE OF MEMBERS TO WORK TOGETHER
- GOOD COMMUNICATION BETWEEN MEMBERS
- GROUP CONSENSUS IN DECISION MAKING
- TRUST AND RESPECT BETWEEN MEMBERS
- HIGH SATISFACTION WITH TEAM SUCCESS

WHAT MAKES TEAMS SUCCESSFUL?

OPEN COMMUNICATION

LISTENING TO EACH OTHER

RESPECT

BEING CO-OPERATIVE

USING EACH OTHER'S KNOWLEDGE, SKILLS, OR EXPERIENCE

TRUSTING EACH OTHER

WILLING TO TRY SOMETHING NEW

UNDERSTANDING SOMEONE'S OPINION

UNDERSTANDING THE GROUP'S OBJECTIVE (HAVING A COMMON GOAL)

REVIEWING YOUR RESOURCES, MATERIALS, SKILLS

COMMON SENSE OF TIMING

BEING POLITE

EXPLAINING YOURSELF

TRYING TO ANTICIPATE PROBLEMS

HELPING SOMEONE ON THE TEAM WHO NEEDS IT

BEING OPEN TO CONSTRUCTIVE CRITICISM

WORKING TOGETHER

HAVING A LEADER (GUIDES, INITIATES, COACHES, GIVES FEEDBACK)

TAKING INDIVIDUAL RESPONSIBILITY

BEING FLEXIBLE

What are Problems?

Predictors	They help mold our future.
Reminders	We are not self-sufficient. We must work together.
Opportunities	They pull us out of our rut and force us to think creatively.
Blessings	They open up doors we usually don't go through.
Lessons	Each new challenge will be our teacher.
Everywhere	No place or person is excluded from them.
Messages	They warn us about potential disaster.
Solvable	No problem is without a solution.

Success Skills for the Textile Industry

Team Building/Problem Solving

Review

______ 1. Which of the following describes a team?

a. group of individuals with different goals
b. group of individuals with each contributing to the whole
c. group of individuals with hidden agendas
d. both a and c

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Team Building/Problem Solving

Review

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- a. identify the problem
- b. delegate responsibility
- c. brainstorm solutions
- d. reassess periodically

Team Building/Problem Solving

Answer Key

1. B
2. D
3. B
4. C
5. D
6. C
7. B
8. C
9. D
10. B

WHAT ARE PROBLEMS ?

Predictors	They help mold our future.
Reminders	We are not self-sufficient. We must work together.
Opportunities	They pull us out of our rut and force us to think creatively.
Blessings	They open up doors we usually don't go through.
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Messages	They warn us about potential disaster.
Solvable	No problem is without a solution.

Appendix D

Textdisc Field Test Results

Instructors in Enterprise State Junior College's Rural Textile Workers Literacy Enhancement Project field tested the TEXTdisc at two locations during 1993 and 1994:

> Clinton Mills, Geneva, Alabama, a spinning and weaving plant employing 500 associates.
>
> Pridecraft Enterprises, Enterprise, Alabama, a worldclass manufacturing facility of reusable hospital garments and linens. The cutting and sewing plant located in Enterprise employs more than 300 people and is a division of Standard Textile in Cincinnati, Ohio.

Results and Comments from Instructors and Students:

CLINTON MILLS

The students who participated in the Workplace Literacy Program did so on a voluntary basis. Of the participants in the program 34 worked on the Reading Section and 25 worked on the Math Section. Users included associates from all job classifications including service operators, spinners, weavers, technicians, supply clerks, and first-line supervisors. User pre-test levels ranged from a 4.2 grade equivalent to a 12.9 grade equivalent. A substantial number of these participants made significant gains on post-test instruments after a combination of TEXTdisc and classroom instruction.

Suggestions

It would be helpful to have instructor access to user records for all students on the roster on one or two screens, rather than having to access each student's records individually. Also, it would be useful to have a summary by roster of the modules completed by each student rather than having to go to each student's records separately.

A number of participants in this program were at a higher level than the lessons currently offered in the math section. The program would be more useful to a greater number of students if some higher level math were included.

Student Comments

"I enjoyed the reading section. It helped me to learn more about other areas of the cotton mill. It was interesting. The math section was too repetitious. There were not enough textile related problems."

Eugene Smith,
Spooler Technician

"The definitions in the vocabulary section were extremely helpful in learning about other areas of the mill. I was only familiar with the weave shop before."

David Swedberg,
Doffer

PRIDECRAFT ENTERPRISES

In the workforce program at Pridecraft, 21 students used the TEXTdisc. The students worked in different areas of the plant holding various titles. These included inspectors, sewing machine operators, spreaders, and work handlers. The ability levels of the students ranged from 6.8 to 12.9.

There was a combined total of 23 hours use among the students. Approximately 6 1/2 hours of this was in math.

The lessons included Cutting and Sewing, Weaving Fabric, Preparing Cotton Fibers for Spinning, The Apparel Industry, Spinning of Wool and Cotton Yarn, Whole Numbers-Adding, Subtracting, and Percents.

The scores ranged from 20% to 100% in the reading modules. This included ESL students. The average range of scores was from 70% - 90%.

The scores ranged from 50% to 93% in the math modules.

Problems Encountered

The math program is set up to concentrate on a specific skill and incorporate review, however, there seems to be too much review and not enough focus on the specific skill. For example, problems dealing with money and decimals should not be included with whole numbers. Also there are multiplication and division problems in the addition of whole numbers section. This is not considered a review when addition is a basic skill that should come first.

Suggestions

It would be helpful for instructors to see a spread sheet of a student's progress without having to look at each individual section.

Instructors need a screen that would allow you to select the student you wish to see without having to use the individual's separate entry code.

Student Comments

My company, Pridecraft Enterprises and the Enterprise State Junior College gave me the opportunity to attend your computer program. I spend time after working hours in the Language course. The following are the things that I liked best about your program: seeing my progress, subjects are interesting, I can go at my own speed, enjoyed using computer itself, clear directions.

The computer program I worked on helped me with my spelling and pronunciation. It also helped me with developing sentences. This program helped me alot and I am currently enjoying it very much.

I had an opportunity to use your computer program this year. My company, Pridecraft Enterprises, and our local junior college, Enterprise State Junior College offered a Language course after work. I liked your program because of the following: helped with my spelling, helped with my pronunciation of the words, work at my pace.

Appendix E

Comprehensive Evaluation Plan

COMPREHENSIVE EVALUATION PLAN
1993-94 NATIONAL WORKPLACE LITERACY PROGRAM
ENTERPRISE STATE JUNIOR COLLEGE

Enterprise State Junior College received a National Workplace Literacy Program Grant for $526,310 for the period April 1, 1993-September 30, 1994. The program partners include MacArthur State Technical College, Adult Basic Education Program, Pridecraft Enterprises, Incorporated, Opp and Micolas Mills, Covington Industries, Clinton Mills of Geneva, and Shaw Industries (formerly Amoco Fabrics and Fibers).

The project evaluation plan will include internal and external, formative and summative procedures. The Project Director will be responsible for project evaluation with the assistance of an external evaluator. Dr. Marilyn C. Beck, President of Lord Fairfax Community College, has been employed as the external evaluator. She has extensive experience in higher education teaching and administration, and in the evaluation of grant projects including Workplace Literacy and Title III.

The Project Director will ensure that the Presidents of the two colleges as well as members of the Project Steering Committee and other partner representatives will be periodically apprised of progress toward achievement of objectives, strengths and weaknesses of the program, and overall project status and effectiveness.

Project staff will assume the responsibility for collecting data and materials to support the formative and summative plans.

The formative plan will include the following:

- Individual education plans(IEP"s)
- Job literacy audit results
- Learner placements
- Job descriptions
- Outreach materials/activities(brochures, fliers, etc)
- Curriculum outlines
- Instructional modules
- Participant lists
- Attendance records

The summative evaluation will assess the overall results and include the following:

- Pre-post test results of achievement in classes
- Pre-post assessment results of surveys of self-esteem and supervisor evaluations
- Attendance records
- Retention data
- Surveys of employee/employer perceptions of project programs and services
- GED completers
- Productivity measures
- Number of job promotions

The evaluation will focus directly on the achievement of the following process and outcome objectives:

Objective 1: By April of 1993, all project personnel will have been employed and given specific job descriptions.

Performance Evaluation Measure - Objective 1: Personnel will be employed with signed employment contracts on file. Job descriptions will also be on file for each project employee.

Objective 2: by June of 1993, project personnel will have designed job specific literacy audits in cooperation with industrial personnel.

Performance Evaluation Measure - Objective 2: Job-specific literacy audits will be developed, reviewed, and approved by the Project Director, appropriate industry representatives, appropriate employee representatives, and project instructors and counselors. Such approval will be in writing and kept in project files. The CASAS will be utilized as the primary assessment tool in this process although this instrument may be extended to assess certain job function not covered.

Objective 3: By July of 1993, job literacy audits will be administered to participating workers in cooperation with industry personnel.

Performance Evaluation Measure - Objective 3: Written results of literacy audits will be on file for each participating employee. A summary of identified deficiencies will also be on file. Records will indicate the results of the literacy audits as pre-tests for project activities.

Objective 4: Beginning in May of 1993, project personnel will develop and implement ongoing outreach activities in cooperation with industry and employee representatives which will result in the recruitment, intake, screening, Individual Education Plan development, and program participation of at least 500 eligible worker applicants by September, 1994.

Performance Evaluation Measure - Objective 4: Records will verify names of participating workers. Individual Education Plans for each worker will be on file, and attendance records will be kept for all project educational activities.

Objective 5: Project personnel will develop, field test, and refine job specific instructional programs to include delivery systems, objectives, learning activities, and evaluation components. (on-going beginning May, 1993)

Performance Evaluation Measure - Objective 5: Learning modules will be on file in workplace instructional laboratories after a documented successful field test.

Objective 6: A minimum of 250 project participants will complete at least 12 weeks of instruction.

Performance Evaluation Measure - Objective 6: Class attendance records will reflect at least 12 weeks attendance by at least 250 employees.

Objective 7: 90% of employees who complete 12 or more weeks of instruction will retain employment or be promoted.

Performance Evaluation Measure - Objective 7: Employment records of project participants will indicate continued employment and/or promotion.

Objective 8: 90% of participants who complete at least 12 weeks of instruction will show statistically significant gains in their supervisors' ratings of work maturity including their communication, literacy skills, safety procedures, cooperation, problem solving abilities, interpersonal relations, punctuality, attendance, positive attitude, appearance, and task completion.

Performance Evaluation Measure - Objective 8: The CASAS Work Maturity Checklist will be used to assess supervisors' perceptions of employee characteristics outlined in the objective. Other instruments may also be used in cases where the CASAS may not be appropriate.

Objective 9: Project participants, in cooperation with industry, volunteer organizations, other college personnel, and appropriate governmental agencies will provide on-going needed support services for project participants. These services shall include, but not be limited to, tutorial services, transportation services, child care services, counseling services, and referral to other services.

Performance Evaluation Measure - Objective 9: Records will indicate the type of service(s) provided and document the individuals receiving the service(s).

Objective 10: Project personnel will devise a Dissemination Plan which will result in project activities and outcomes being disseminated throughout the region and allow the project to serve as a demonstration site for rural textile workplace literacy programs. The plan will include the development and publication of a booklet on project goals, activities, and results which will be publicized nationally and disseminated to those who request it.

Performance Evaluation Measure - Objective 10: The Dissemination Plan will be kept in project files and monitored by the Project Director for appropriate and timely implementation. The evaluation measure for the booklet will be the publication of the approved product.

Objective 11: By July of 1993, project personnel will develop a detailed formative evaluation plan to monitor implementation of project activities. Summative evaluation will be performed by and experienced, qualified external evaluator to be contracted from project funds.(See Appendix K - Specifications for External Evaluator)

Performance Evaluation Measure - Objective 11: The detailed evaluation plan will be kept in project files and monitored by the Project Director in checklist fashion. Fulfillment of the outside evaluator's contract and publication of the Summative Evaluation Report will serve as indicators of final project evaluation.

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Objective 12: On-going workplace literacy activities will be institutionalized and continued in at least two of the industry partners' workplace after the conclusion of USDE support.

Performance Evaluation Measure - Objective 12: A filed description and written certification of continuing activities by industry CEO's will constitute fulfillment of the objective.

Objective 13: 80% of employees who successfully complete at least 12 weeks of instruction will show significant gains in self-esteem as measured by a pre- and post-administration of the Coopersmith Inventory (or other appropriate instrument) with a sample of participants.

Performance Evaluation Measure - Objective 13: A pre- and post-administration of the Coopersmith Inventory (self-esteem), utilizing a randomly selected, statistically significant sample of project participants who have successfully completed at least 12 weeks of instruction will be compared to assess gains.

Objective 14: As a result of project participation, at least 50 employees will obtain a GED certificate.

Performance Evaluation Measure - Objective 14: Copies of GED certificates, scores, or official letters documenting receipt of passing scores will be on file in employees' project folders and noted on IEP's.

Objective 15: Following conclusion of the project period at least two additional non-participating area textile industries will adopt the methods and materials developed in the project to address their workplace literacy improvement needs.

Performance Evaluation Measure - Objective 15: A written certification by the industry CEOs will be on file in the Project Director's office within six months of project completion.

In addition, project staff will collect appropriate data/information to answer the questions on the Evaluation Graphic Summary on the following page. The external evaluation will place particular emphasis on questions 1 and 2. Items 3-9 are covered in the preceding objectives.

Evaluation Graphic Summary

Major Summative Evaluation Questions	Answer Source/s	Data Collection Time
1. Did workers who participated in Gateway training increase basic literacy skills?	Standardized Tests (pre-post) (Ex. TABE, CASAS) composite of analysis of teacher-made pre-post test results	Months 5-17
2. Did workers who participated in Pathway training increase performance efficiency (including self-esteem)?	CASAS Work Maturity Checklist (pre-post), Coopersmith Inventory (pre-post)	Months 3-17
3. Did significant numbers of workers participate in training for significant periods of time?	IEP's, Attendance Records	Months 4-17

Major Formative Evaluation Questions

1. Was a set of literacy demands identified for each job classification in the worksites?	Copy of set of job classifications and related literacy requirements (job/literacy audits)	Months 2-3 primarily (ongoing)
2. Were employees assessed to determine discrepancies in job literacy demands and employee abilities?	Completed Job Audits/CASAS Inventories and Checklists	Months 2-3 primarily ongoing
3. Was a curriculum created to match literacy demands with employee needs?	IEP's, Learning Activity Packages	Months 2-17 ongoing
4. Was a curriculum applied to meet job/employee literacy demands?	IEP's, Learning Activity Packages, Pre-post assessments	Months 4-17
5. Were employees provided needed support services?	Employee Support Service Request Forms, IEP's, Referral Follow-up Interviews (Project Counselors)	Months 4-17
6. Was a Dissemination Plan developed and implemented?	Product - publication of plan - Steering Committee Approval	Months 3-18
7. Was an Evaluation Plan developed and implemented?	Product - publication of plan - Steering Committee Approval	Months 3-18
8. Did at leat 50 employees obtain GED's?	Copies of Certificates	Months 4-17
9. Did the project serve as an effective demonstration model?	CEO Certificates of adoption of methods/materials	Months 17-18 and thereafter 6 months

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The external evaluator will monitor project progress based on the Project Management Plan(Proposal pages 36-40) established by the proposal. She will conduct four site visits to the project to interview personnel and participants and to review records and curriculum. She will submit a report following each visit identifying strengths and weaknesses, assessing progress toward objective attainment, and making suggestions and recommendations for improvement as needed.

The final summative external evaluation report will be comprehensive and assess all aspects of the project as recommended for Workplace Literacy Projects. There will be an analysis of pre and post test data using the t test for statistical significance when appropriate. Descriptive analysis will also be utilized.

Appendix F

Institutionalization of Workplace Literacy Programs

INDUSTRY TRAINING
PARTNERSHIP AGREEMENT

AS AUTHORIZED REPRESENTATIVES OF CLINTON MILLS, WE AGREE ON THEIR BEHALF TO THE FOLLOWING TERMS AND CONDITIONS WITH RESPECT TO THE INDUSTRY TRAINING PROGRAM ADMINISTERED BY ENTERPRISE STATE JUNIOR COLLEGE.

WE:

Agree to accept the proposal for industry education program (Attachment A) employing Gena W. Holley as a full-time, on-site instructor for fiscal year October 1, 1994, through September 30, 1995, at the annual salary disclosed in the proposal.

Have read and accepted the provisions of the job description for the position of Instructor of Training for Business and Industry (Attachment B) and for the Adult Education Instructor (Attachment C) to be assumed by Mrs. Holley.

Understand that instructional costs absorbed by the Southeast Alabama Adult Education Multi-System outlined in Attachment A require a minimum enrollment of fifteen (15) participants, with ten (10) of those in regular attendance. Failure to meet those attendance guidelines will result in increased program costs to Clinton Mills.

Understand that instructional costs absorbed by Training for Business and Industry will vary directly to the number of contact hours produced in the on-site training classes. Failure to generate the 3,840 contact hours outlined in Attachment A will result in increased program costs to Clinton Mills.

Agree that reimbursements to Enterprise State Junior College for program costs will be made on a monthly basis as invoiced by the college.

Will submit to Enterprise State Junior College a written notice of intent to cancel this contract thirty (30) days in advance of such action.

Will coordinate training programs with the Industrial Coordinator and the Supervisor of Adult Education programs at Enterprise State Junior College to ensure that those programs operate within the guidelines of the Alabama Department of Education.

Barry L. Hooks, Vice-President
Clinton Mills

9/19/94
Date

Robert L. Dettmar, Human Resource Dir.
Clinton Mills

9-19-94
Date

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Rural Textile Workers
Literacy Enhancement Project

WORKPLACE CURRICULA CATALOG

Enterprise State Junior College
MacArthur State Technical College
Southeast Alabama Adult Education Network
Clinton Mills
Covington Industries
Opp and Micolas Mills
Pridecraft Enterprises
Shaw Industries

Funded by the U. S. Department of Education
Grant Number V198A30143

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WORKPLACE CURRICULA CATALOG
INTRODUCTION

This catalog is a listing of the job-specific curricula produced by a 1993 Rural Workplace Literacy grant funded by the U.S. Department of Education. The project involved an educational partnership between Enterprise State Junior College, MacArthur State Technical College, and the Southeast Alabama Adult Education Network. The curriculum modules represent lessons that were developed and field-tested in training classes in five textile plants that were also partners in the federal grant. Those firms included Clinton Mills, Covington Industries, Opp-Micolas Mills, Pridecraft Enterprises, and [illegible]aw Industries.

The literacy grant provided for the writing and dissemination of workplace teaching materials expressly for the textile industry. These curricula represent a functional context approach to addressing the training needs of both entry-level workers and first-line supervisors. They range from the most basic of math, reading, and language skills to the "soft" skills, such as problem solving, team building, and critical thinking. Rather than setting about the task of developing lesson plans for each individual job description within each plant, curriculum was developed for job clusters or categories. Project staff identified a number of jobs that shared many of the same skill requirements. Although a module may have been developed for a loom technician, similar job skills may be required for persons employed as weavers and cloth inspectors. To that extent, trainers may wish to cluster or categorize a number of jobs relative to their skill requirements.

Most modules consist of a curriculum guide, a detailed lesson plan, and instructor-made pretests and posttests. Other materials include instructor-made activity sheets and answer keys. All materials are currently available in hardcopy format.

The curriculum guides and lesson plans refer to hand-outs from books in print and company-owned materials that are considered to be proprietary. Due to copyright laws and requests from partnership firms, those portions of the modules may not be available for dissemination. Book titles and page numbers are listed on the curriculum guide to assist the user in locating published materials.

In order to modify these teaching materials for an individual plant site, we recommend that instructors and trainers substitute job-specific materials where applicable. Plant managers and training coordinators have been extremely accommodating in providing job-specific materials to the project. We acknowledge their cooperation and support in this endeavor.

The majority of the curriculum modules listed in this catalog were developed to address the general skills needed to succeed on the job as outlined in the Comprehensive Adult Student Assessment System (CASAS) Workplace Analysis Job Profile. Workplace literacy project staff, assisted by employees and supervisors, conducted job literacy audits to determine specific skills for each job or job cluster.

Each curriculum module is catalogued under a broad subject title. Usually, subjects are further usually divided into general instructional objectives. Finally, subjects or objectives are sub-divided into specific workplace training objectives. For example, WRITING SKILLS encompasses three general instructional objectives: (A) Using Legible Writing and Appropriate Grammar, (B) Utilizing Occupational Specific Forms, and (C) Writing Comprehensively. A specific workplace instructional objective listed under (B) Utilizing Occupational Specific Forms is (200) Write common abbreviations specific to the job. The example below shows the relationship between entries in this catalog and a sample curriculum guide.

EXAMPLE

II. Writing Skills

- A. Use Legible Writing and Appropriate Grammar. (1 page-Curriculum Guide only - $.35)
  - *II.A.200.* Utilize appropriate mechanics of standard English.
- B. Utilize Occupational Specific Forms. (14 pages - $1.45)
  - *II.B.100.* Record date, time and other requested information on work forms, charts, graphs.
  - *II.B.200.* Write common abbreviations specific to the job.
- C. Write Comprehensively. (14 pages - $1.45)
  - *II.C.100/300.* Write information in clear, logical, and complete manner. Write short notes and/or simple memos.

MODULE Writing Skills

GENERAL INSTRUCTIONAL OBJECTIVE: Utilize occupational specific forms. JOB TITLE: Loom Technician

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
II.B.200 Write Common abbreviations specific to the job.	Discuss how and when abbreviations are used in the various work areas.	Handouts of textile abbreviations and symbols	Participants will write ten abbreviations.

An order form is printed on the last page of this catalog.

I. Reading Skills

A. Read and Interpret Vocational Vocabulary. (27 pages - $2.55)

I.A.100.	Read and interpret general vocational vocabulary.
I.A.200.	Read and locate information listed in alphabetical order.
I.A.300.	Utilize reference materials and glossary lists in vocational texts, manuals, and handouts.
I.A.400.	Identify abbreviations and symbols specific to the job.

B. Read and Interpret Written Vocational Materials. (51 pages - $4.70)

I.B.100.	Read and interpret specific information from written materials, e.g., employee contract employee handbooks, personnel policies, business letters/memos, and job manuals.
I.B.200.	Read and interpret written instructions from instructor and supervisor.
I.B.300.	Read and interpret written sequential directions in textbooks, manuals, and handouts.
I.B.400.	Read and interpret employee/student progress records or performance appraisals.
I.B.500.	Utilize table of contents, index, and appendices in textbooks, manuals, and handouts.
I.B.600.	Read and interpret basic instructions and labels in operating equipment and utilizing supplies.
I.B.700.	Read and interpret charts, graphs, tables, and forms.
I.B.800.	Read and interpret maps, schematic diagrams, pictorial drawings, illustrations and blue prints.
I.B.900.	Read and interpret basic switches and dials.
I.B.1000.	Read directions and interpret basic computer materials, e.g., printouts, software programs,etc.
I.B.1100.	Read and interpret quality control tools, e.g., checksheets, graphs and diagrams, control charts, cause and effect diagrams.

C. Read and Interpret Basic Health and Safety Procedures at the Job/Training Site. (9 pages - $1.20)

I.C.100/300.	Read and interpret safety warning posters, signs, rules, and procedures including house keeping, fireprotection, emergency situations and accident prevention. Read and interpret instructions for safe use of equipment, materials, and machines.

II. Writing Skills

A. Use Legible Writing and Appropriate Grammar. (1 page-Curriculum Guide only - $.35)

II.A.200.	Utilize appropriate mechanics of standard English.

B. Utilize Occupational Specific Forms. (14 pages - $1.45)

II.B.100.	Record date, time and other requested information on work forms, charts, graphs.
II.B.200.	Write common abbreviations specific to the job.

C. Write Comprehensively. (14 pages - $1.45)

II.C.500.	Use computer for simple word processing.
II.C.600.	Organize information into a brief written report.

III. Measurement and Numerical Skills

A. Utilize Occupational Specific Math. (220 pages - $16.80)

III.A.100.	Perform computations of addition, subtraction, multiplication and division using whole numbers.
III.A.200.	Perform computations of addition, subtraction, multiplication and division using fractions.
III.A.300.	Perform computations of addition, subtraction, multiplication and division using decimals.
III.A.400.	Determine mathematical equivalents by converting fractions, percentages, and decimal fractions.
III.A.500.	Compute averages using whole numbers, fractions, decimals or percentages.
III.A.600.	Convert US Standard to International Metric System of Measurement and or vice/versa.
III.A.700.	Determine approximations by estimating, judging, and rounding off the numbers.
III.A.800.	Perform mathematical operations using a calculator or other business machine.

B. Understand Occupational Specific Use of Mathematical Symbols. (36 pages - $3.50)

III.B.100.	Interpret ratio and proportion.
III.B.200.	Interpret data from graphs, e.g., line, bar, picture and circle graphs.
III.B.300.	Identify lower and upper case Roman numerals up to 1000 (e.g. table contents).

C. Utilize Occupational Specific Measurement Skills. (56 pages - $5.20)

III.C.100.	Calculate with units of time.
III.C.200.	Perform basic measurement tasks determining length, width, height, weight.
III.C.300.	Read and interpret basic measurement and numerical readings on instruments.
III.C.400.	Solve measurement problems in US Standard and Metric units using linear dimensions, area, volume, weight, geometric shapes and angles.

D. Utilize Occupational Specific Math. (60 pages - $5.60)

III.D.100.	Working with signed numbers: addition.
III.D.101.	Working with signed numbers: subtraction.
III.D.102.	Working with signed numbers: multiplication.
III.D.200.	Determining area and perimeter of squares and rectangles.
III.D.300.	Solving word problems.

E. Understand GED Math-related Concepts. (32 pages - $3.05)

III.E.100.	Mini-lectures (15-20 minutes) on such topics as averages, scientific notation, powers and roots, order of operations, evaluation and solving algebraic expressions, slopes, and angles.

F. Teach Prerequisites for Calculating Numerical Values and Constructing Simple Control Charts. (143 pages - $10.05)

III.F.100.	Perform computations using decimals, including adding, subtracting, multiplying, and dividing.
III.F.200.	Apply a conversion factor to change from one unit of measurement to another.
III.F.300.	Solve problems using percents, including writing percents as decimals, as well as writing decimals as percents. Calculate the percent of a number, and find a number when the percent is given.
III.F.400.	Compute averages using whole numbers, decimals, or percentages.
III.F.500.	Identify the mean, median, mode, and range from a series of values.
III.F.600.	Interpret and apply ratio and proportion.
III.F.700.	Read and interpret tables, charts, and graphs. Construct graphs using given data and by formulating needed data.

G. Teach the Basic Mathematical Formulas Needed to Calculate Measures of Central Tendency Applied to Problem Solving and SPC Techniques. (18 pages - $1.90)

III.G.100.	Apply formulas to solve for mean, average of the mean, range, average of the range stand deviation, upper and lower control limits of the mean, and upper and lower control limits of the range.

IV. Organization and Learning Skills

A. Demonstrate ability to organize time and prioritize responsibilities. (25 pages - $2.45)

IV.A.401.	The benefits and techniques of effective planning.
IV.A.402.	Setting goals and managing by objectives.
IV.A.403.	Effective time management and delegation.

V. Communication Skills (35 pages - $3.40)

V.100.	Follow spoken sequential directions.
V.300.	Interpret task-related communications such as following, clarifying, giving, or providing feedback to oral instructions.
V.400.	Formulate and ask questions to clarify information.
V.500.	Use appropriate non-verbal communication.
V.600.	Organize information into an oral report.
V.700.	Utilize English that is acceptable with supervisors, peers, and clients.
V.800.	Engage in appropriate social interaction with supervisors, the public, co-workers, and instructors.
V.900.	Initiate action in response to requests from the supervisor, instructor, or customer.

VI. Critical Thinking and Problem-Solving Skills (24 pages - $2.40)

VI.200.	Identifying effective problem-solving strategies such as formulating, evaluating, and choosing options.
VI.300.	Solving problems and arriving at decisions as a team member in a work setting. Strategies for managing change.
VI.301.	Solving problems and arriving at decisions as a team member in a work setting. Making the right decision.
VI.302.	Solving problems and arriving at decisions as a team member in a work setting. Strategies for effective team building.

VII. Knowledge of Workplace Expectations

A. Understand Employer Expectations of Workplace Interaction. (11 pages - $1.30)

VII.A.400.	Demonstrate ability to solve interpersonal conflicts on the job. Managing conflict constructively.
VII.A.401.	Demonstrate ability to solve interpersonal conflicts on the job. Dealing with difficult employees.

B. Understand Employer Expectations of Workplace Behavior. (60 pages - $5.60)

VII.B.401.	Identifying appropriate behavior, attitudes, and social interaction in the workplace. Examine the role of personality and power in leadership situations.
VII.B.402.	Identifying appropriate behavior, attitudes, and social interaction for keeping a job and getting a promotion.
VII.B.403.	Identifying appropriate behavior, attitudes, and social interaction for keeping a job and getting a promotion. Use of positive assertiveness skills in managing workplace situations.
VII.B.404.	Identifying appropriate behavior, attitudes, and social interaction in the workplace. Applying effective coaching and counseling techniques in the leadership process.
VII.B.405.	Identifying appropriate behavior, attitudes, and social interaction in the workplace. Conducting the employee performance appraisal.
VII.B.406.	Identifying appropriate behavior, attitudes, and social interaction in the workplace. Developing a healthy organizational climate.

VIII. Workplace Skills for Textile Supervisors (68 pages - $6.00)

VIII.100.	Recognize the role of worker perception in communicating a positive image of the task and organization.
VIII.200.	Identify effective leadership styles. Analyze his or her own current leadership style, and assess its effectiveness in managing workplace situations.
VIII.300.	Motivating for productivity. Explore some of the classical theories of worker motivation and how those theories are challenged by changes in employee attitudes and work ethics.
VIII.400.	Personality and "People Skills". Analyze one's own personality type and identify strengths and weaknesses. Understand that the work group contains a variety of personality types. Identify techniques for matching worker personality profiles to task assignments.

VIII.500. Conducting workplace meetings. Develop the skills for planning and conducting effective workplace meetings.

VIII.600. Effective oral presentation. Develop skills for preparing and delivering an oral presentation to a group.

VIII.700. Team building (2 class meetings) examines the purposes and benefits of team-based decision making. Understand the roles of team members and the importance of open communication. Develop the ability to make and execute decisions as a team member of a project. Develop one's ability as a team builder.

IX. Success Skills for the Textile Industry

A. Master Basic Skills (40 pages - $3.65)

IX.A.100. Master mathematics, reading, and writing skills for hourly textile workers.

B. Achieve Quality, Commitment, and Adaptability for Hourly Textile Workers. (12 pages - $1.35)

IX.B.100. Reading and interpreting company quality policy, mission statement, creed, and logo.

C. Stress and Time Management (16 pages - $1.80)

IX.C.100. Define stress. Identify causes and techniques for stress management. Learn to prioritize and plan tasks to eliminate time wasters.

D. Oral and Written Communication (25 pages - $2.45)

IX.D.100. Master the listening process. Improve speaking skills. Explore techniques for non-verbal communication. Effectively write memos and other work-related communication.

E. Teamwork and Problem-Solving (16 pages - $1.80)

IX.E.100. Identify elements of a successful team. Explain the role of problem-solving in the contemporary workplace.

X. Workplace Writing for First-Line Supervisors

A. Assist Employees in Writing Basics, Editing, and Choosing a Format Consistent with Industry Needs. (28 pages - $2.60)

X.A.100. Select task-appropriate words; eliminate sexist language; improve punctuation, grammar, and spelling.

XI. Stress Management for First-Line Supervisors

A. Identify Personal and Workplace Stressors. Design and Implement a Plan to Deal with Stress. (9 pages - $1.20)

XI.A.100. Identify short and long-term effects of stress. Design an individual stress management plan.

XII. Coaching Skills for First-Line Supervisors.

A. Provide Learning Activities to Advance Coaching and Leadership Skills (38 pages - $3.[illegible]0)

XII.A.100. Relates coaching strategy of Lou Holtz; examines ways of confronting and overcoming resistance.

XIII. Effective Training Skills for Analytical Methods Instructor

A. Teach Instructors How to Teach Adults. (13 pages - $1.40)

XIII.A.100. Explains adult learning styles; how to write training objectives and develop effective training aids.

Please use this form to order materials. The price covers only a minimal fee to cover the costs of reproducing the materials and mailing the order.

If you have questions regarding the development or use of these modules, contact the Director of the Workplace Literacy Project at Enterprise State Junior College at (205) 347-2623, ext. 226. Calls placed after January 1, 1995, should be made to (304) 347-2623, ext. 226.

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Clinton Mills
Covington Industries
Opp and Micolas Mills
Pridecraft Enterprises
Shaw Industries

Funded by the U. S. Department of Education
Grant Number V198A30143

MODULE: Workplace Writing **JOB TITLE:** First line supervisor/clerical

GENERAL INSTRUCTIONAL OBJECTIVE: To assist employees in reviewing writing basics, updating language skills, applying editing skills, and choosing a style and format consistent with industry needs

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
X.A.100.			Pre/Post Assessment
1. Choose task-appropriate words from a list os confusables	Visual display Explanation Worksheet	Overhead projector Confusables transparency Confusables worksheet	
2. Effectively eliminate sexist language from writing	Explanation Worksheet	Non-sexist Language: Making it Clear handout, worksheet	
3. Use contractions properly	Visual display Discussion Worksheet	Contractions transparency Overhead projector Contractions worksheet	
4. Correctly use punctuation marks	Visual display Discussion Worksheet Unit Review	Punctuation Marks transparency Overhead projector Worksheet English Essentials Unit review p. 87	
5. Write with correct verb tense and correct subject/verb agreement	Explanation Practice	English Essentials pp. 20-31	
6. Effectively use pronouns	Explanation Practice	English Essentials pp. 49-53	

MODULE: Workplace Writing **JOB TITLE:** First line supervisor/clerical

GENERAL INSTRUCTIONAL OBJECTIVE: To assist employees in reviewing writing basics, updating language skills, applying editing skills, and choosing a style and format consistent with industry needs

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
7. Identify common grammatical errors	Usage exercises	English Essentials pp. 94-106	
8. Write with clarity	Explanation Examples	Writers, Inc. pp. 38-44	
9. Utilize a spelling guide to become better spellers	Explanation Practice	English Essentials pp. 108-115	
10. Choose a style and format suitable for industry needs	Reading Memo writing Letter writing	Writers, Inc. pp. 163-171	
11. Apply editing and proofreading skills to business writing	Reading Exercises Practice	Basic English Brushup pp. 195-206	

MODULE: Effective Writing Skills

GENERAL INSTRUCTIONAL OBJECTIVE: To assist staff members in reviewing writing basics, updating language skills, applying editing skills, and choosing a style and format consistent with industry needs.

Motivational Activity

Instructor will ask participants to consider a work-related problem. The instructor will then ask participants to list potential causes for the problem, possible solutions for the problem, someone inside the plant who can help solve the problem, and someone outside the plant who can help solve the problem. Instructor will ask participants to draft a memo to the in-plant person, describing the problem, listing potential causes and possible solutions, and asking for help. Instructor will then ask participants to draft a letter to the outside person describing the problem, listing potential causes and possible solutions, and asking for help. Participants will then put the memo and letter aside for later use.

Learning Activities

Pre-assessment - distribute test, ask participants to complete; collect

Confusables - Instructor will display an overhead transparency of "Confusables", then distribute Confusables handout and worksheet for participants to read and complete. Instructor will then go over correct answers.

Non-sexist language - Instructor will distribute copies of Non-sexist Language: Making it Clear, and explain that sexist language in the workplace is a critical issue. Instructor will also point out that many who use sexist language do so because of grammar and writing practices which were once taught in schools. Even though some writers see no harm in using sexist language, they often create unnecessary barriers for their readers when they do so. Participants will complete the worksheet, then instructor will explain answers.

Contractions - Instructor will distribute handout Using Contractions: When and How. Instructor will discuss what contractions are (words formed by a combination of two words, with and apostrophe used to replace omitted letters), when contractions are used (casual conversation and writing) and how (replacing an omitted letter with and apostrophe). Instructor will then introduce examples from handout. Participants will complete "Practice" on pages two and three of the handout, then instructor will present correct answers.

MODULE: Effective Writing Skills

GENERAL INSTRUCTIONAL OBJECTIVE: To assist staff members in reviewing writing basics, updating language skills, applying editing skills, and choosing a style and format consistent with industry needs.

Punctuation - Instructor will present transparency Punctuation, then distribute handout Punctuation: Getting The Details. Distribute copies of English Essentials and ask participants to complete "Unit Review" on page 87.

Verbs/Agreement - Introduce verbs by explaining that they can express action as well as condition. Ask participants to complete practice on page 20 of English Essentials, using page 23 as a basis, explain verb tense, regular and irregular verbs. Assign "Practice" on page 24. Using page 30 as a basis, explain subject/verb agreement, then complete "Practice 1 and 2" on pages 30 and 31. Discuss any problem participants may have experienced.

Pronouns - Instructor will explain that a pronoun is a word which replaces a noun, and that an antecedent is the noun to which the pronoun refers. Instructor will also explain that the pronoun and antecedent must agree in number. Instructor will then ask participants to complete "Practice" 1 and 2 on pages 49 and 50.

Usage - Using page 94 as a basis, instructor will explain that good usage requires the following: right use of word, correct grammar, clear language form, effective form of expression, and acceptable style. Instructor will then ask participants to scan pages 94-105, then complete "Review" on page 106. Instructor will give correct answers, and discuss any problems with participants.

Clarity - Instructor will refer to pages 38-44 of Writer's INC. to explain obstacles to clear writing. Instructor will ask participants to share any humorous examples of unclear writing which they have encountered.

Spelling - Instructor will use pages 108-113 to explain common spelling errors as well as to explain how to use a spelling guide. Participants will complete each "Practice" then write any words from page 113 which may be troublesome.

Post Assessment - distribute tests, ask participants to complete. Collect.

Concluding Activity

Instructor will distribute copies of Basic English Brush-up, and ask participants to complete "Proofreading" pages 195-207.

MODULE: Effective Writing Skills

GENERAL INSTRUCTIONAL OBJECTIVE: To assist staff members in reviewing writing basics, updating language skills, applying editing skills, and choosing a style and format consistent with industry needs.

Instructor will then ask participants to revise memos and letters, correcting any errors relate to confusables, sexist language, contractions, punctuation, subject/verb agreement, pronouns, usage, clarity, or spelling. Participants will then swap notes and memos with editing partners for editing and proofreading purposes. After swapping notes and memos to original owners, participants will make needed corrections.

WRITING SKILLS FOR INDUSTRY

Preview

Directions: Place the letter for the correct response in the blank provided.

_____ 1. The employee would not __________ the new position.

a. accept b. except

_____ 2. Which is an example of sexist language?

a. The girls in the office finished early.
b. The mechanic is noted for speed and accuracy.

_____ 3. Which is an example of correct use of a comma?

a. If you finish early you need, to begin the next project.
b. Red, green, and black were the new yarn colors.
c. The shiny new expensive machine, looked good.

_____ 4. Choose the incorrectly worded statement.

a. The electricians request more information.
b. The caller request to speak to a supervisor.

_____ 5. A pronoun:

a. can never replace a noun
b. can often be used to replace a verb
c. requires a noun to accompany it
d. can replace a noun

_____ 6. Choose the best wording of the sentence:

a. The manager thought the trainee improved his method.
b. The manager thought the trainee's own method was an improvement.
c. The manager thought the trainee improved the trainee's method.

_____ 7. True or false: Knowing the correct pronunciation of a word is of little value if you are trying to spell the word.

_____ 8. True or false: There is only one correct method for writing a memo.

WRITING SKILLS FOR INDUSTRY

Preview (Con't)

______ 9. True or false: Proofreading is valuable only if one has plenty of time before a deadline.

______ 10. Choose the correct order for the following proofreading steps:

1 - Proofread final draft before submitting
2 - Reread entire document
3 - Type a neat final copy
4 - Check for errors in usage, punctuation, spelling, grammar
5 - Seek help from an editor
6 - Consult a dictionary

a. 6-5-4-3-2-1
b. 4-5-6-2-3-1
c. 3-5-4-6-2-1
d. 2-6-4-5-3-1

WRITING SKILLS FOR INDUSTRY

Review

Directions: Place the letter for the correct response in the blank provided.

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a. accept b. except

_____ 2. Which is an example of sexist language?

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Review (Con't)

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a. 6-5-4-3-2-1
b. 4-5-6-2-3-1
c. 3-5-4-6-2-1
d. 2-6-4-5-3-1

WRITING SKILLS FOR INDUSTRY

Preview/Review

1. A
2. A
3. B
4. A
5. D
6. B
7. F
8. F
9. F
10. B

WRITING: GETTING STARTED

Someone once said, "Writing is mind-travel, destination unknown." As an employee of industry, you may find such an open-ended approach unprofessional or inappropriate for work-related writing. Think, though, for a minute that writing is a problem-solving method, and often as we write, we clear our minds, and think of new solutions to problems. As problems are solved, we may indeed find ourselves reaching an "unknown destination."

Consider for a moment a problem you are having at work (be careful if it involves other people--you will be sharing your thoughts with someone else in the workshop). Write a statement describing the problem:

List potential causes for the problem:

List possible solutions for the problem:

Determine someone in the plant who can help solve the problem:

Determine someone outside the plant who can help solve the problem:

Draft a memo to the in-plant person, describing the problem, listing potential causes, possible solutions, then ask for his/her help.

Draft a memo to the outside-the-plant person, describing the problem, listing potential causes, possible solutions, then ask for his/her help.

Now put these aside. We'll review some writing basics, then give you a chance to rewrite your memo and letter.

TIPS FOR WRITING

1 - WRITE AS YOU WOULD SPEAK

2 - KNOW YOUR SUBJECT

3 - BE HONEST

4 - GET PERSONALLY INVOLVED WITH YOUR WRITING

5 - RELAX - DON'T RUSH

QUESTIONS FOR REVISING

1 - DOES MY LETTER OR MEMO WORK?

2 - IS MY LETTER OR MEMO INTERESTING?

3 - IS MY STYLE NATURAL AND DOES MY LETTER OR MEMO COMMUNICATE CLEARLY?

4 - DOES MY WRITING CONTAIN ANY WEAKNESSES?

5 - HOW CAN I IMPROVE?

EDITING TIPS

1 - RE-READ FOR ACCURACY

2 - REFER TO A DICTIONARY

3 - CHECK FOR MECHANICAL ERRORS

4 - SEEK HELP

5 - WRITE OR TYPE A NEAT FINAL COPY

6 - PROOFREAD FINAL COPY

CONFUSABLES

As you can see, the root word of "confusables" is confuse. Confusables are those words which sound very similar, but have different meanings and possibly different spellings. Not knowing which ones to use in your business and industry writing can lead to something very similar confusion! Here are some examples of confusables. Which ones have you encountered in your writing?

accept, except; affect, effect; allusion, illusion; already, all ready; altogether, all together; ascent, assent; base, bass; berth, birth; blew, blue; board, bored; brake, break; by, buy; cannon, canon; canvas, canvass; capital, capitol; cent, sent, scent; chord cord; coarse, course; complement, compliment; counsel, council; dear, deer; die, dye; eminent, imminent; flair, flare; heal, heel; hear, here; heard, herd; heir, air; hole, whole; immigrate, emigrate; it's, its; knew, new; loose, lose; mail, male; metal, meddle, medal, mettle; miner, minor; pain, pane; past, passed; peace, piece; personal, personnel; right, write, wright, rite...okay, so you get the idea. I'll quit (or is it quite, or quiet?) this exhaustive [and exhausting] list, and concentrate on a few that are most commonly used.

accept - to receive
except - other than

affect - to influence
effect - to produce

allusion - indirect reference
illusion - false picture or idea

complement - fulfill
compliment - praise

die - stop living
dye - to change color

personal - private
personnel - employees

sight - act of seeing
cite - to quote
site - location

to - preposition "in direction of"
too - also
two - the number

wait - to stay in expectation
weight - degree or unit of heaviness

board - piece of wood; administrative group
bored - unimpressed, unchallenged

brake - device used to stop a vehicle
break - separate or destroy; recess

by - preposition meaning "beside"
buy - purchase

counsel - advice
council - group which advises

past - previous time
passed - went by

principal - primary; administrator
principle - idea or doctrine

their - possessive personal pronoun
there - adverb for location
they're - contraction they are

waist - part of body
waste - verb, decay
waste - noun, useless material

your - possessive pronoun
you're - you are

BEST COPY AVAILABLE

CONFUSABLES

Worksheet

DIRECTIONS: Choose the correct word to fill the blank.

1. The ________________ goal of the new employee is to maintain a high quality standard. (principal, principle)
2. The quality control clerk __________________ several supervisors in her discussion of the new procedure. (sighted, cited, sighted)
3. Will the new machinery _________________ production? (affect, effect)
4. A new type of ________________ is required for that
5. The new product __________________ inspection. (past, passed)
6. The new employee has the __________________ to operate heavy equipment. (ability, capacity)
7. Was he able to recognize __________________ ... ? (a, an)
8. The operators were allowed to choose __________________ the ... (among, between)
9. The new employee often asked the supervisor, "_______________ I take a break now?" (can, may)
10. Will you give me the correct __________________ of ... on that ... ? (amount, number)

CONFUSABLES

Answer Key

1. principal
2. cited
3. affect
4. N/A (proprietary)
5. passed
6. ability
7. N/A
8. N/A
9. may
10. N/A

NON-SEXIST LANGUAGE: MAKING IT CLEAR

DO'S	DON'TS
A. Re-word sentences to avoid gender-specific pronouns.	*Use masculine pronouns when you refer to a person in general.
B. Show both sexes as successful professionals when you write.	*Typecast women as inferior in rank or position.
C. Represent both sexes as having a wide range of strengths and weaknesses.	*Represent men as strong, women as weak.
D. Represent both sexes on the same scale, whether it be appearance-or mind-related.	*Discuss women in relation to appearance while discussing men in relation to abilities.
E. Treat jobs as equally suitable for both sexes.	*Indicate that a woman's presence in a particular profession is unusual.
F. Represent men and women as equal partners.	*Represent women as possessions of men.
G. Address both sexes with respect.	*Use disrespectful or demeaning slang to refer to either sex.
H. Use non-gender-specific substitutes for man-words.	*Use man-words to refer to people in general.
I. Use equal language for both sexes.	*Refer to "men and ladies, etc."
J. Use specific occupational titles.	*Use man-words for job titles, or add "-ess" to "feminize" a job title.

NON-SEXIST LANGUAGE: MAKING IT CLEAR

WORKSHEET

Directions: In the following statements, write the letter of the infraction from the do/don't list which describes the sexist language used.

_____ 1. The committee will elect a new chairman next week.

_____ 2. The high-ranking official and his beautiful wife were invited for a plant tour.

_____ 3. While men often welcome the challenge of lifting heavy equipment, women usually fear it.

_____ 4. An effective manager will communicate with his people.

_____ 5. The innovations represent a great leap for mankind.

Directions: Revise the following statements to bring them in accordance to standards of non-sexist language.

6. The girls in the office have finished the time-consuming project.

____

____

____

____

____

7. A good operator will take pride in his work.

____

____

____

____

____

NON-SEXIST LANGUAGE: MAKING IT CLEAR

WORKSHEET (Con't)

8. The female mechanic was well-known for her speed.

9. Men may bring their wives to the company picnic.

10. If you have any questions about the flight, contact the stewardess.

NON-SEXIST LANGUAGE: MAKING IT CLEAR

Answer Key

1. H
2. D, F
3. C
4. A
5. H

6. - 10. Answers will vary

USING CONTRACTIONS: KNOWING WHEN AND HOW

Contractions are words formed by a combination of two words, with an apostrophe used to replace omitted letters.

When: Contractions are used in casual conversation and writing. In a business or industry setting, contractions are appropriate for memos and any correspondence where the goal is an easy, familiar tone. In **formal writing**, the only acceptable contraction is o'clock, for "of the clock".

How: To form a contraction, simply replace an omitted letter with an apostrophe. Some common contractions are listed below:

I'm (I + am, with "a" replaced by apostrophe)
it's (it + is, with "i" replaced by apostrophe—do not confuse with its, which means "belonging to it")
doesn't (does + not, with "o" replaced by an apostrophe)
don't (do + not, with "o" replaced by an apostrophe)
she'll (she + will, with "wi" replaced by an apostrophe)
you'd (you + would, with "woul" replaced by an apostrophe)
won't (will + not, with "o" taking the place of "ill" and an apostrophe replacing the "o" in "not")

USING CONTRACTIONS: KNOWING WHEN AND HOW

Worksheet

Directions: Make the following word pairs into contractions.

1. I would ______________________________
2. could not ______________________________
3. can not ______________________________
4. what is ______________________________
5. they will ______________________________
6. we will ______________________________
7. did not ______________________________
8. who is ______________________________
9. you will ______________________________
10. I would ______________________________

Directions: In the space provided, write the contractions of the words in parentheses.

1. ... (was not) ____________ ...
2. The machinery (is not) ____________ dangerous if employees follow safety procedures.
3. (They would) ______________ prefer a stress-free environment, but a stress-free environment (is not) ____________ a realistic goal.
4. I (would not) ______________ use contractions in that formal proposal which is to be sent to ... , but (I would) __________use them in those in-plant memos to ask for suggestions about the proposal.
5. I plan to relax on my days off so (I will) ___________be at my best when I return to work.

USING CONTRACTIONS: KNOWING WHEN AND HOW

Worksheet (Con't)

Directions: Compose two sentences which include contractions. Write them in the space provided.

1. ______________________________

____

____

____

2. ______________________________

____

____

____

USING CONTRACTIONS: KNOWING WHEN AND HOW

Answer Key

1. I'd
2. couldn't
3. can't
4. what's
5. they'll
6. we'll
7. didn't
8. who's
9. you'll
10. I'd

1. wasn't
2. isn't
3. They'd, isn't
4. wouldn't, I'd
5. I'll

PUNCTUATION: GETTING THE DETAILS

The marks: period. comma, semicolon; colon: dash-- hyphen- question mark? exclamation point! "quotation marks" italics (parentheses) [brackets] apostrophe' {brace} asterisk* diagonal/

The marks listed above are some of the more common used in writing for business and industry. The **usage** of these marks is sometimes challenging. Some of the marks are used so seldom that we often forger them, or choose to ignore them. Others have several uses, and we sometimes get confused about how to use them properly. In this section of the workshop, we'll focus on some guidelines for proper usage.

PERIOD.

A single period is used to end a declarative sentence (one which states something, or issues a command which is not an exclamation). Example: Plant 65 is located in Andalusia.

Three periods (...) are referred to as an ellipsis. It is used when one or more words has been left out of a quotation (a space should be on either side of an ellipsis when typing). If the sentence ends at the end of the omitted section, place a period after the ellipsis, thus creating four periods (....). Example: John's supervisor asked, "Are these ... the only samples from this line?" She responded, "There are several more ...."

A period should be place after an initial. Example: Phillip C. Johnson

A period should be placed after an abbreviation, unless the abbreviation is an acronym. Example: Mr. Shaw visited the plant.

(An acronym is a word formed from the first or first few letters of words in a phrase. Examples OSHA, DACUM)

COMMA,

Commas are used to indicate separation. They are used between two independent clauses joined by coordinating conjunctions (but, or, nor, for, yet, and so). Example: Smoking is not allowed in all areas of the plant, but some areas have smoking stands.

Commas are used to separate individual words, phrases, or clauses in a series. Example: Twisting, texturizing, and packout will welcome several new employees.

Commas are used to offset an appositive (an explanatory noun used in a sentence). Example: ...

Commas are used to separate coordinate adjectives which equally modify the same noun. Example: ...

PUNCTUATION: GETTING THE DETAILS

Page Two

Commas separate dependent from independent clauses. Example: If the supplier creates an inferior product, the customer will refuse it. (The comma is not necessary if the dependent clause follows the independent. Example: The customer will refuse the product if it has been created in an inferior manner.)

Commas are used to offset nonrestrictive clauses. Example: Mary, who arrived early, is a very punctual employee. (If a clause is nonrestrictive, it is not absolutely necessary in order for the sentence to have meaning)

Commas set off items in an address and items in a date. Example: The address of the plant is Shaw Industries Plant 65, 200 Waites Drive, Andalusia, Alabama 36420.

Commas are used to offset direct quotes. Example: The new employee said, "I have never been in such a large plant before."

Commas are used to separate an interjection or weak exclamation from the rest of the sentence. Example: Hey, did you see that lifttruck?

Commas are used to enclose titles, initials, and names which follow surnames. Example: Gary Smith, M.D., and Elizabeth Jones, Ph.D., will conduct the stress management clinic for industrial nurses.

SEMICOLON;

Semicolons have two main uses:

(1) to join two or more independent clauses (Example: Susan was about to begin her long weekend; John, however, was returning to work.)

(2) to separate groups of words or phrases which already contain commas (Example: Mr. Davis needs to see someone from ..., ..., ...; HR, accounting, and quality control; ..., ..., and maintenance.)

COLON:

The colon is heavily used in writing for business and industry. Some common uses are:

(1) after the salutation of a business letter (Example: Dear Mr. Shaw:)
(2) in memo formats (From: Training Department, To: Instructors, Subject: Training Classes, Date: May 21, 1994)
(3) to introduce a list (Example: Please bring the following: ..., ..., and ...)

PUNCTUATION: GETTING THE DETAILS

Page Three

DASH—

Dashes are used to indicate a sudden break or change in thought, or to emphasize a word, series, or phrase (Example: We have had a good safety record—some improvements could be made—but we are thankful for the good record.)

HYPHEN-

Hyphens are used to form compound words (Examples: state-or-the-art, heat-set, on-the-job training, take-up floor), to write fractions (three-sixteenths, three-eighths), to join a capital letter to a noun or participle (U-buggies, T-shirts), to form new words beginning with prefixes (ex-president, self-esteem), to hyphenate names (Debra DeStefano-Tolar, Olivia Newton-John), to join words in compound numbers from twenty-one to ninety-nine, and to separate a word at the end of a line of print (a word may be divided between syllables, and the hyphen is always placed after the syllable at the end of a line, not before a syllable at the beginning of the following line).

QUESTION MARK?

A question mark is used at the end of a sentence which asks a question (Example: Do you know the ... of that ...?

EXCLAMATION POINT!

The exclamation mark is used to express excitement, danger, or strong feeling (Example: Grab the fire extinguisher!)

"QUOTATION MARKS"

Quotation marks are used before and after direct quotations (Example: "The new employee said, "I have never been in such a large plant before."

Usage notes: Quotation marks are placed before and after each passage being quoted. They may also be used to distinguish a word being discussed (Was the new employee familiar with the meaning of "..."?), to indicate a word is slang (We "ain't" dealing with that any more), or to indicate a special use of a word (An employee who works in ... must locate the "..."). Quotation marks are also used to punctuate song article, and course titles (Examples: Does anyone have a recording of

"Something's Burning" by the First Edition? We would like to use it in a fire safety meeting. Which of you have taken the course "..."? Did anyone read "Edwards Demming, the Father of SPC" in Manufacturing Digest?)

Punctuation inside quotation marks: Periods and commas are placed inside. Exclamation points and question marks are placed inside quotation marks when they punctuate the quotation, outside when they punctuate the sentence. Semicolons and colons are placed outside quotation marks.

When a word inside a quotation needs quotation marks (slang, emphasis, etc.), use single marks. (Example: Elizabeth said, "My supervisor is always saying 'my way or the highway.'"

UNDERLINING (ITALICS)

Underlining and italics serve the same purpose in punctuation: to indicate titles of magazines, newspapers, pamphlets, books, plays, films, radio and television programs, etc. (Example: Today we viewed the film Is It Always Right to be Right?)

Italics and underlining are also used to indicate the titles of ships and aircraft (Example: While in New York City, we saw the Trump Princess in the East River.)

Do not underline or put in quotes title of sacred writing (Example: Bible)

[BRACKETS]

Brackets are used if a writer adds his or her own material to a quoted passage (Example: "The right man [or woman] is the one who seizes the moment.")

—J. W. Goethe

APOSTROPHE'

As we have previously discussed, apostrophes are used to indicate when a letter has been omitted from a contraction. They are also used in the following ways:

(1) to form the plural of a number or letter (Example: How do you make your 8's?)
(2) to form the possessive of a noun (Where did you put Angie's book?)

{BRACES}

Braces are used to join elements that are somehow related. Though not standard punctuation, braces are often used in notes, forms, memos, and letters. Example:

```
           88.9
    ...   {93.4
           91.2
```

ASTERISK*

When one or more paragraphs are omitted from a quotation, use three asterisks(***) in a row. No other material should appear on that line. One asterisk (*) may be used to indicate an explanation at the bottom of a page.

DIAGONAL/

MEASUREMENT
AND
NUMERICAL SKILLS

For Textile Employees

MODULE Measurement and Numerical Skills

GENERAL INSTRUCTIONAL OBJECTIVE: To utilize occupational specific math **JOB TITLE:** Loom Technician

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
III.A.100 To perform computations of addition, subtraction, multiplication, and division including multiple operations using whole numbers.	1.1.1 Motivational Activity: Relate a situation on the job in which a loom technician needs to add the total of looms serviced in a month.	"Textile Related Calculations Using Whole Numbers" Problem 1	10 problems - Preview
	1.2.1 Instructional Activity: Introduce vocabulary.		
	1.3.1 Instructional Activity: Present concepts in addition of single digits, and 2 or more digits.	Pre-GED Mathematics and Problem-Solving Skills, Book 1, pp 18-25.	
	1.4.1 Instructional Activity: Use motivational problem (1.1.1) to introduce how to set up and solve a word problem.	Pre-GED Mathematics and Problem-Solving Skills, Book 1, pp 28-29.	
	1.5.1 Give additional practice with job related word problems.	"Textile Related Calculations Using Whole Numbers."	
	1.6.1 Instructional Activity: Administer pre-test.	"Preview--Subtraction of Whole Numbers".	Pretest
	1.7.1 Instructional Activity: Teach vocabulary.		
	1.8.1 Instructional Activity: Present concepts in subtraction to include "borrowing".	Pre-GED Mathematics and Problem-Solving Skills, pp 44-49.	
	1.9.1 Instructional Activity:	"Subtraction"	Pre-test

Give additional practice with word problems. Post test #11-23.		
1.10.1 Instructional Activity: Administer pre-test on multiplication.	"Preview--Multiplying Whole Numbers."	Post-test
1.11.1 Instructional Activity: Teach Vocabulary.		
1.12.1 Instructional Activity: Present concepts in multiplication of single digits, and 2 or more digits.	*Pre-GED Mathematics and Problem-Solving Skills,* pp 72-80.	
1.13.1 Instructional Activity: Teach setting up and solving word problems using multiplication.	"Multiplication"	
1.14.1 Instructional Activity: Administer post-test on multiplication.		Post-test
1.15.1 Instructional Activity: Administer pre-test on Division.	"Preview--Division of Whole Numbers."	Pre-test
1.16.1 Instructional Activity: Ask participants to divide into groups for work on division.		
1.17.1 Instructional Activity: Teach vocabulary.		
1.18.1 Instructional Activity: Present concepts of division when the divisor is a single digit, and multiple digits. Introduce long division and remainders.	"Division Without Fractional Remainders", problems 40-52; "Division With Fractional Remainders" problems 53-58.	
1.19.1 Instructional Activity: Administer post-test on Division.		Post-test

WORKFORCE LESSON PLAN

Job Title:

Module: Measurement and Numerical Skills

General Instructional Objective: Utilize occupational specific math.

Specific Instructional Objective: To perform computations of addition, subtraction, multiplication, and division including multiple operations using whole numbers.

1.1.1 Motivational Activity

Administer pre-test entitled "Addition of Whole Numbers- Preview". Provide solutions and have students score their papers. Then, relate a situation on the job in which a loom technician needs to report the total of all the looms serviced in a month.

1.2.1. Instructional Activity

Teach the following vocabulary words: addend, sum, digit, carry, carrying.

1.3.1. Instructional Activity

Present concepts in addition of single digits and addition of double-digit numbers. Refer to examples on pages 18-25 of Pre-GED Mathematics and Problem-Solving Skills, Book I.

1.4.1. Instructional Activity

Refer to the motivational activity in exercise 1.1.1. Ask participants to make a number sentence that represents the total of all looms serviced or repaired in a month. Refer to pages 28-9 of the Pre-GED Mathematics and Problem-Solving Skills. Explain how to set up and solve a word problem.

1.5.1. Instructional Activity

Circulate the handout entitled "Textile-Related Calculations Using Whole Numbers. Have students solve the word problems 1-10 in addition. Administer as a pre-test of the abilities to solve word problems in addition.

1.6.1. Instructional Activity

Administer the pre-test entitled "Preview--Subtraction of Whole Numbers".

1.7.1. Instructional Activity

Define the following terms: subtract, difference, minuend, subtrahend, minus, and borrowing.

1.8.1. Instructional Activity

Present the basic rules for subtraction, to include the concept of "borrowing". Use examples from pages 44-49 of the Pre-GED Mathematics and Problem-Solving Skills. Assign the odd numbered problems from the Pre-GED Mathematics and Problem-Solving Skills, Book I, pages 56-59. This will allow students additional practice in the concept of borrowing.

1.9.1. Instructional Activity

Assign additional practice in subtraction using word problems. Circulate the handout entitled "Subtraction". Ask students to complete problems 11-23 as a post-test of their understanding of subtraction.

1.10.1. Instructional Activity

Administer the pre-test entitled "Preview--Multiplying Whole Numbers". Ask participants to calculate how many yards of fabric a certain loom would weave in 6 days. Discuss the data needed in order to make that calculation, as well as the steps they employed in arriving at the solution.

1.11.1. Instructional Activity

Teach vocabulary, Define the terms: product, multiplicand, multiplier, multiplication table, and approximation.

1.12.1. Instructional Activity

Teach the rules involved in multiplication of single digits, as well as those for multiplying numbers with 2 or more digits. Present the concept involved in multiplying with zeroes. Teach students the rules involved in multiplying values by 10, 100, and 1,000. Use the book entitled Pre-GED Mathematics and Problem-Solving Skills, pp 72-80.

1.13.1. Instructional Activity

Teach students the principle of setting up and solving a word problem using multiplication. Provide additional practice by distributing the handout entitled "Multiplication", and having students complete problems 24-39.

1.14.1. Instructional Activity

Administer a post-test. Instructor should devise a short work-related test to determine the mastery level of students in multiplication using borrowing, solving word problems in multiplication, and multiplying by 10, 100, and 1,000.

1.15.1. Instructional Activity

Administer the pre-test entitled "Preview--Division of Whole Numbers".

1.16.1. Instructional Activity

Ask participants to divide into groups of two. Assign the following question: How would you calculate the width of a roll of cloth when the number of warp threads per inch are known? List the responses on the chalkboard and clarify the steps.

1.17.1. Instructional Activity

Teach vocabulary. Define the following terms: dividend, divisor, quotient, remainder, long division, and rounding.

1.18.1. Instructional Activity

Circulate the handouts entitled "Division Without Fractional Remainders" problems 40-52, and "Division With Fractional Remainders", problems 53-58. Explain why it is often necessary to "round off" numbers when a remainder exists. Provide the solutions to the word problems and review where necessary.

1.19.1. Instructional Activity

Construct and administer a work-related post-test that will determine the level of mastery of long division.

SY

ADDITION OF WHOLE NUMBERS PREVIEW

1. $5 + 7 =$

2. $$\begin{array}{r} 8 \\ 9 \\ +2 \\ \hline \end{array}$$

3. $$\begin{array}{r} 23 \\ +\ 7 \\ \hline \end{array}$$

4. $$\begin{array}{r} 152 \\ +\ 43 \\ \hline \end{array}$$

5. $$\begin{array}{r} 623 \\ 134 \\ +\ 21 \\ \hline \end{array}$$

6. $$\begin{array}{r} 3005 \\ 1412 \\ +\ 310 \\ \hline \end{array}$$

7. $$\begin{array}{r} 75 \\ 48 \\ +\ 7 \\ \hline \end{array}$$

8. $$\begin{array}{r} 400 \\ 308 \\ +396 \\ \hline \end{array}$$

9. $$\begin{array}{r} 11{,}298 \\ 4{,}509 \\ +\ 9{,}582 \\ \hline \end{array}$$

10. If a weaver weaves 650 yards of cloth the first day, 704 the second day, and 967 the third day, how many yards did he weave in three days?

SY

TEXTILE-RELATED CALCULATIONS
Using Whole Numbers

ADDITION

1. The first week of November a technician completed the 6-month oil change on 6 looms. In the following weeks he completed the same service on 3 looms, 5 looms, and 8 looms. How many looms did he service in November?

2. If there are 840 looms in room #1 and 810 looms in room #2 and 290 in room #3, how many looms are in the textile mill?

3. If a weaver weaves 650 yards of cloth the first day, 704 the second day and 967 the third day, how many yards did he weave in three days?

4. In the plant, 980 looms make 45-inch cloth, 460 looms make 144-inch cloth, 380 looms make 36-inch cloth. How many looms are in the plant?

5. In the spinning room the weekly report showed the following: 198,666 pounds of warp yarn, 56.976 pounds of filling yarn, and 487 pounds of waste. What was the total amount of yarn passing through the spinning room?

6. Last month Bobby worked 41 hours the first week, 40 hours the second week, and 39 hours the third week. How many hours did Bobby work last month?

7. A spinning room report showed the following amounts of warp yarn spun during the week: Monday, 17,167; Tuesday, 12,833; Wednesday, 15,219; Thursday, 16,497; Friday, 11,896. What was the total amount of warp yarn spun during the week?

8. A buyer buys three bales of cloth containing 1328 yards, 1424 yards and 1088 yards. How many total yards did the buyer receive?

9. In the spinning room the weekly report showed the following: 125,248 pounds of warp yarn, 87,239 pounds of filling yarn, and 767 pounds of waste. What was the total amount of yarn passing through the spinning room?

10. During the last month, Greg worked 44 hours the first week, 48 hours the second week, and 39 hours the third week. How many hours did Greg work last month?

SY

Preview - Subtraction of Whole Numbers

1. $\begin{array}{r} 14 \\ -\ 6 \\ \hline \end{array}$

2. $\begin{array}{r} 456 \\ -211 \\ \hline \end{array}$

3. $\begin{array}{r} 9000 \\ -5283 \\ \hline \end{array}$

4. $\begin{array}{r} 325 \\ -118 \\ \hline \end{array}$

5. 207 - 183 =

6. 5,020 - 2,394

7. $\begin{array}{r} 183 \\ -\ 97 \\ \hline \end{array}$

8. $\begin{array}{r} 946 \\ -436 \\ \hline \end{array}$

9. $\begin{array}{r} 2000 \\ -\ 849 \\ \hline \end{array}$

10. From a bale of sheeting which had 1,803 yards, 396 yards have been cut off. How many yards are left?

SUBTRACTION

11. The weekly production in a spinning room is 74,592 pounds. If 46,664 pounds is filling yarn, what is the weight of the warp yarn?

12. From a bale of sheeting which had 1,803 yards, 396 yards have been cut off. How many yards are left?

13. If a spinning room has 26,614 spindles, and 11,125 spindles are running warp yarn and the rest of them are running filling yarn, how many are running filling yarn?

14. A plant has 940 drill looms and 690 sheeting looms. How many more drill looms than sheeting looms?

15. From a bale of burlap containing 1,034 yards, 360 have been cut. How many yards remain in the bale?

16. 62847 pounds is the weekly production of a certain spinning room. If 38,117 pounds of this are warp, how much is filling? A cut of certain style of cloth weighs 14 pounds. If it contains 8 pounds, what is the weight of the warp and sizing?

17. The cut marks on the warp for a certain style of cloth are 124 yards apart as the warp comes from the slasher. The cut marks in the woven cloth are 118 yards apart. How much has the warp contracted during weaving?

18. 25,000 pounds of cotton were manufactured into cloth, making 21,987 pounds of cloth. How many pounds were lost in manufacturing?

19. Arkwright patented the first ring spinning frame in the year 1796. How many years has it been in use up to 1972?

20. In 1894 the present type of automatic loom was put on the market. How many years has it been in use up to 1972?

21. An order comes to the plant for 251,570 yards of a certain style of cloth. The warehouse has 544,000 yards of the cloth in storage. After filling the order, how many yards will be left in storage?

22. An order calls for 208,000 yards of a certain style of cloth. 199,788 yards have been made. How many yards must be made to complete the order?

23. The weights of ten section beams before being slashed are as follows: 478 pounds, 475 pounds, 479 pounds, 471 pounds, 474 pounds, 475 pounds, 476 pounds, 474 pounds, 474 pounds, and 477 pounds. After being slashed, this same yarn has a total weight of 5206 pounds. How many pounds of sizing has the slasher put into the yarn?

Preview - Multiplying Whole Numbers

1. $\begin{array}{r} 9 \\ \underline{\text{x}6} \end{array}$

2. $\begin{array}{r} 143 \\ \underline{\text{x}\ \ 2} \end{array}$

3. $\begin{array}{r} 423 \\ \underline{\text{x}210} \end{array}$

4. $\begin{array}{r} 46 \\ \underline{\text{x}\ 8} \end{array}$

5. $\begin{array}{r} 384 \\ \underline{\text{x}\ \ 7} \end{array}$

6. $\begin{array}{r} 86 \\ \underline{\text{x}47} \end{array}$

7. $\begin{array}{r} 375 \\ \underline{\text{x}284} \end{array}$

8. $\begin{array}{r} 271 \\ \underline{\text{x}152} \end{array}$

9. $\begin{array}{r} 163 \\ \underline{\text{x}\ 24} \end{array}$

10. **200 looms on a certain style of cloth weave 52 yards per loom per day; 180 looms on another style weave 48 yard per loom per day. How many yards will the 380 loom weave in six days?**

MULTIPLICATION

24. There are 12 rows of looms. Each row has 9 looms. What is the total number of looms?

25. If 225 looms each weave 65 yards of fabric, what is the total number of yards produced?

26. Each yard of lap from a certain picker weighs 15 ounces. What is the weight of a 48-yard lap?

27. What would be the value of 220 bales of cloth at $150 a bale?

28. If one bale of cloth contains 20 pieces of cloth, 25 yards each, how many yards are there in 24 bales?

29. A reed 41 inches long has 24 dents to the inch. How many dents in the reed?

30. How many bobbins are required to fill 1940 batteries, if each battery contains 23 bobbins?

31. The weight of yarn on a full spinning bobbin with 6-inch traverse is about 2 ounces from a 1 3/4-inch ring. How many ounces should a doff weigh from a 320-spindle frame?

32. A buyer sends an order to a mill for 512 bales of cloth, each bale to contain 20 forty-yard pieces. The plant ships him 162 bales. How many yards remain of the order?

33. A company buys 300 bales of cotton, the average weight being 490 pounds per bale; 14,000 pounds of this cotton go to waste. How many pounds of cloth are produced from this cotton?

34. If the hank clock registers 15 hanks per spindle made in a day, how many hanks would be made on 2 frames of 92 spindles? If each hank of this size roving weighs 4 pounds, how many pounds are produced in a day?

35. 200 looms on a certain style of goods weave 52 yards per loom per day; 180 looms on another style weave 48 yards per loom per day. How many yards will the 380 looms weave in six days?

36. In a weave room there are 834 looms. There are 2 harnesses on each loom and each harness contains 890 heddles. How many heddles on all the looms?

37. How many dollars will it cost for supplies for 28 sections for a year, if the average cost if $187 a month per section?

38. On a loom running 182 picks per minute how many times will it pick in 8 hours if it does not stop?

39. A loom runs 7 hours on the first shift, 6 1/2 hours on the second shift and 7 1/4 hours on the third shift. How many total picks did it make if it ran at a speed of 160 picks per minute.

SY

PREVIEW - DIVISION OF WHOLE NUMBERS

1. $5\overline{)40}$

2. $28 \div 4 =$

3. $4\overline{)4080}$

5. $7\overline{)377}$

6. $4\overline{)72}$

7. $16\overline{)384}$

8. $28\overline{)845}$

9. $272 \div 4 =$

10. A picker lap containing 50 yards weighs 45 pounds. How many ounces does each yard weigh?

DIVISION WITHOUT FINAL REMAINDERS

40. If 504 looms are divided equally between 12 weavers, how many looms will be each weaver's share?

41. If 704 looms are divided among 16 weavers, for how many looms will each weaver be responsible?

42. If a loom will weave 225 yards of cloth in a week, how many weeks will be required for it to weave 9675 yards?

43. A cloth of 48 warp threads per inch contains 1728 warp threads. How wide is the cloth?

44. 840 yards of number one yarn weighs one pound. How many pounds in 74,760 yards?

45. A 60,032 spindle plant is equipped with spinning frames containing 224 spindles to a frame. How many spinning frames are there in the plant?

Yarn and Roving Numbers:

The number of yarn is found by dividing 1000 by the number of grains that 120 yards weigh.

Example: 120 yards of a certain size of yarn weigh 10 grains. What is the number of the yarn?

46. What is the number of the yarn if 120 yards weigh 20 grains?
What is the number of the yarn if 120 yards weigh 25 grains?
What is the number of the yarn if 120 yards weigh 40 grains?
What is the number of the yarn if 120 yards weigh 50 grains?

The number of roving is found by dividing 100 by the number of grains that 12 yards weigh.

47. What is the number of the roving if 12 yards weigh 10 grains?
What is the number of the roving if 12 yards weigh 20 grains?
What is the number of the roving if 12 yards weigh 25 grains?
What is the number of the roving if 12 yards weigh 50 grains?
What is the number of the roving if 12 yards weigh 100 grains?

48. If a certain frame produces 4576 pounds of a certain size roving in a day, how many days will be required for it to produce 13,728 pounds?

49. 70 spinning frames, 224 spindles to each frame, spin 62,720 pounds in a week. How many pounds does each spindle run?

50. A plant runs 300 days in a year, and manufactures 12,400 bales of cloth averaging 1260 yards per bale. Find the average yards manufactured per day.

51. A 64 yard piece of picker lap weighs 4 pounds. How many ounces does each yard of lap weigh?

52. A picker lap weighs 14 ounces per yard. How many yards should there be in a lap weighing 84 pounds?

DIVISION WITH FRACTIONAL REMAINDERS

53. Ten bobbins of roving weigh 39 pounds. What does each bobbin weigh?

54. If 120 yards of yarn weigh 74 grains, what is the weight of each yard?

55. If a piece of cloth 60 yards in length is cut into 4 equal parts, how many yards will each part contain?

56. A reed 42 inches long contains 845 dents. How many dents are there to an inch?

57. A picker lap containing 50 yards weighs 45 pounds. How many ounces does each yard weigh?

58. 6 yards of card sliver weigh 351 grains. What is the weight of the card sliver per yard?

MODULE: Measurement and Numercial Skills

GENERAL INSTRUCTIONAL OBJECTIVE: Utilize Occupational Specific Math **JOB TITLE:** Sewing Machine Operator

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
III.A.200 Perform computations of addition, subtraction, multiplication and division, including multiple operations, using common or mixed fractions.	A.2.1 **MOTIVATIONAL ACTIVITY:** The instructor will divide an apple in half and then proceed to cut the half in half and each of those in half showing that although the parts to the whole are getting smaller, the apple is still the same. The half that is not cut is equivalent to the pieces that have been cut when added together. If two additional apples were cut each in halves then you would have three times as many halves.	Apple	Observation
	2.2 Administer Pretest	Attachment 2.2	15-item pretest
	2.3 Preteach Vocabulary	Attachment 2.3	
	INSTRUCTIONAL ACTIVITIES:		
	2.4 Instructor lecture on expressing fractions in lowest terms. Use circles showing the equivalence of	Attachment 2.4 Additional practice: Number Power 9 p.9 PMI p.61	Student response Observation

1/2, 2/4, 3/6, 5/10. Explain how each reduces to 1/2 by finding the GCF of the numerator and the denominator and dividing to reduce to the lowest terms. Work through additional examples.		
2.5 Instructor lecture on improper fractions and mixed numbers. Use a number line to show the equivalence of fractions to whole numbers. Mark the whole numbers 1 - 5 and have students fill in with thirds and sixths. Point out that 3/3 is the same as 1 and so on. Use the circle activity (2.5a).	Attachment 2.5 Attachment 2.5a Additional practice: PMI pp.62-63 Number Power 9	Observation .
2.6 Mini lecture on changing mixed numbers to improper fractions. Work through some examples with students and provide practice if necessary.	Attachment 2.6 Additional practice: Number Power 6	Observation
2.7 Identify equivalent fractions by using the yarn activity (attachment 2.7a) and examples of fractions that can be simplified to 1/2. Use lowest terms and cross product method. Give a specified denominator and find an equivalent fraction using examples of denominators greater than and less than the given denominator. Guide students in finding common multiples of numbers as a review for renaming fractions with a LCD using equivalent fractions. Assign practice sheet and discuss upon	Attachment 2.7 Attachment 2.7a Attachment 2.7p	Observation

completion.		
2.8 Review shills and begin discussion on adding fractions and mixed numbers. Remind students that they should always simplify their answer. List and discuss rules using examples and guided practice. Instructor should show the relation of the rules for adding and subtracting fractions and mixed numbers. Explain that when subtracting fractions or mixed numbers, it is sometimes necessary to borrow before the subtraction can be followed through. Follow with examples. Give practice exercises and discuss.	Attachment 2.8 Attachment 2.8p	
2.9 Using the rules for multiplying fractions and mixed numbers, work through examples on the board. Discuss the rules and have students respond to solve problems.	Attachment 2.9	Observation
2.10 Instructor should write some fractions on the board and have students identify which ones are reciprocals of each other. Do the same activity with mixed numbers and have students write the reciprocal. Using the rules for dividing fractions and mixed numbers, discuss and have students work through practice problems.	Attachment 2.10 Attachment 2.10p	

2.11 Discuss the Rules of Order (PMDAS) as a review. Have students work through some problems with multiple operations where this must be followed.		
2.12 CULMINATING ACTIVITY: Give students an assignment to find at least 5 examples of how the operations studied are used on their job. Discuss and share with the class.		
2.13 Give teacher-made post test of 10 problems. Discuss the answers upon completion and identify if further instruction is needed.	Attachment 2.13	10-item post test

WORKPLACE LESSON PLAN

Job Title:

Module: Mathematics

General Instructional Objective: Utilize occupational specific math.

Specific Instructional Objective: Perform computations of addition, subtraction, multiplication and division, including multiple operations, using common or mixed fractions.

MOTIVATIONAL ACTIVITY:

The instructor will divide an apple in half and then proceed to cut the half in half and each of those in half showing that although the parts to the whole are getting smaller, the apple is still the same. The half that is not cut is equivalent to the pieces that have been cut when added together. If two additional apples were cut each in halves then you would have three times as many halves.

ADMINISTER PRETEST: Have students take a pretest to assess the depth of the discussion on fractions that is needed. The test results will indicate to the instructor whether a review is sufficient or whether in-depth instruction is needed in the preliminary operations of finding the LCM, GCF, LCD, equivalent fractions.

PRETEACH VOCABULARY.

INSTRUCTIONAL ACTIVITIES:

Instructor lecture on expressing fractions in lowest terms. Use circles showing the equivalence of 1/2, 2/4, 3/6, 5/10. Explain how each reduces to 1/2 by finding the GCF of the numerator and the denominator and dividing to reduce to the lowest terms.

Instructor lecture on improper fractions and mixed numbers. Use a number line to show the equivalence of fractions to whole numbers. Mark the whole number 1 - 5 and have students fill in with thirds and sixths. Point out that 3/3 is the same as 1 and so on. Use the circle activity (2.5a).

Mini lecture on changing mixed numbers to improper fractions. Work through some examples with students and provide practice if necessary.

Identify equivalent fractions by using the yarn activity (Attachment 2.7a) and examples of fractions that can be simplified to 1/2. Use lowest terms and cross product method. Give a specified denominator and find the equivalent fraction using examples of denominators greater than and less than the given denominator.

Guide students in finding common multiples of numbers as a review for renaming fractions with a LCD using equivalent fractions.

Review skills and begin discussion on adding fractions and mixed numbers. Explain that when subtracting fractions or mixed numbers, it is sometimes necessary to borrow before the subtraction can be followed through. Follow with examples. Give practice exercises; discuss using circles on the board, guide students to express mixed numbers as improper fractions. Explain that this is necessary to perform the multiplication and division operations. Give practice exercises.

Instructor should write some fractions on the board and have students identify which ones are reciprocals of each other. Do the same activity with mixed numbers and have students write the reciprocal.

Using the rules for dividing fractions and mixed numbers, discuss and have students work through practice problems.

Discuss the Rules of Order (PMDAS) as a review. Have students work through some problems with multiple operations where this must be followed.

CULMINATING ACTIVITY:

Give students an assignment to find at least 5 examples of how the operations studied are used on their job. Discuss and share with the class.

Give teacher-made post test of 10 problems. Discuss the answers upon completion and identify if further instruction is needed.

PRETEST

Objective: Perform computations of addition, subtraction, multiplication and division including multiple operations using common or mixed fractions.

Express in lowest terms:

1. $\frac{72}{81}$ 2. $\frac{30}{35}$

Rewrite as a whole number or mixed number.

3. $\frac{63}{7}$ 4. $\frac{47}{6}$

Express as an equivalent fraction having the denominator specified.

5. $\frac{1}{5} = \frac{n}{15}$ 6. $\frac{7}{8} = \frac{n}{64}$

Simplify the equation.

7. $\frac{3}{5} + \frac{7}{8}$ 8. $\frac{6}{25} + \frac{8}{25}$

9. 4 4/5 - 3 2/5 10. 9 3/4 - 3 1/3

11. 2 2/3 X 3 1/4 12. 8 ÷ 7/8

13. 7 2/9 ÷ 2/3 14. 1/2 X 9/10 - 1/3

15. 1 2/3 ÷ 3/5 X 4

(2.2)

PRETEST ANSWER KEY

FRACTIONS

1. 8/9
2. 6/7
3. 9
4. 7 5/6
5. n=3; 3/15
6. n=56; 56/64
7. 1 19/40
8. 14/25
9. 1 2/5
10. 6 5/12
11. 8 2/3
12. 9 1/7
13. 10 5/6
14. 7/60
15. 11 1/9

(2.3)

Objective: Perform computations of addition, subtraction, multiplication and division including multiple operations using common or mixed fractions.

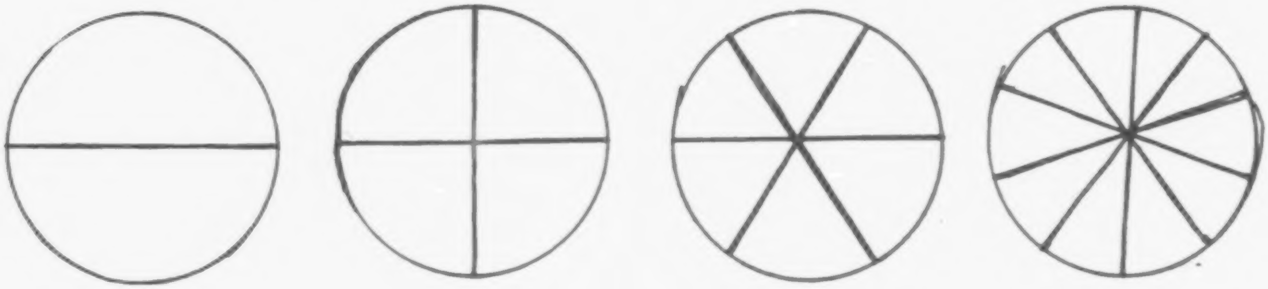
VOCABULARY

1. fraction - a smaller part of a whole.
2. denominator - the bottom number of a fraction. It represents the total number of parts into which a whole has been divided.
3. numerator - the top number of a fraction. It represents how many of the total number of parts are under consideration.
4. proper fraction - one in which the numerator is less than the denominator.
5. improper fraction - a fraction in which the numerator is equal to or greater than the denominator.
6. mixed number - a combination of a whole number and a fraction.
7. equivalent fraction - fractions that name the same number.
8. lowest terms - the numerator and denominator have no common factors other than 1.
9. simplifying the fraction - writing a fraction in lowest terms.
10. L.C.D. - Least common denominator - the least possible whole number (excluding zero) that can be divided exactly by the denominators of all the given fractions.
11. G.C.F. - Greatest common factor - the largest common factor of the denominators of all the given fractions.
12. least common multiple - L.C.M. - of two or more numbers is the least nonzero number that is a multiple of all of them. It is the smallest possible whole number (excluding zero) that can be divided exactly by all the given numbers.
13. reciprocal - the inverse of a fraction. The numerator becomes the denominator and the denominator becomes the numerator.

(2.4)

EXPRESSING FRACTIONS IN LOWEST TERMS

Draw circles on the board to show the equivalence of 1/2, 2/4, 3/6, 5/10.



Explain how each reduces to 1/2 by finding the GCF of the numerator and the denominator and dividing to reduce to the lowest terms.

Ex. 36/48 = 3/4

18/45 = 2/5

4/9 = 4/9

9/45 = 3/15

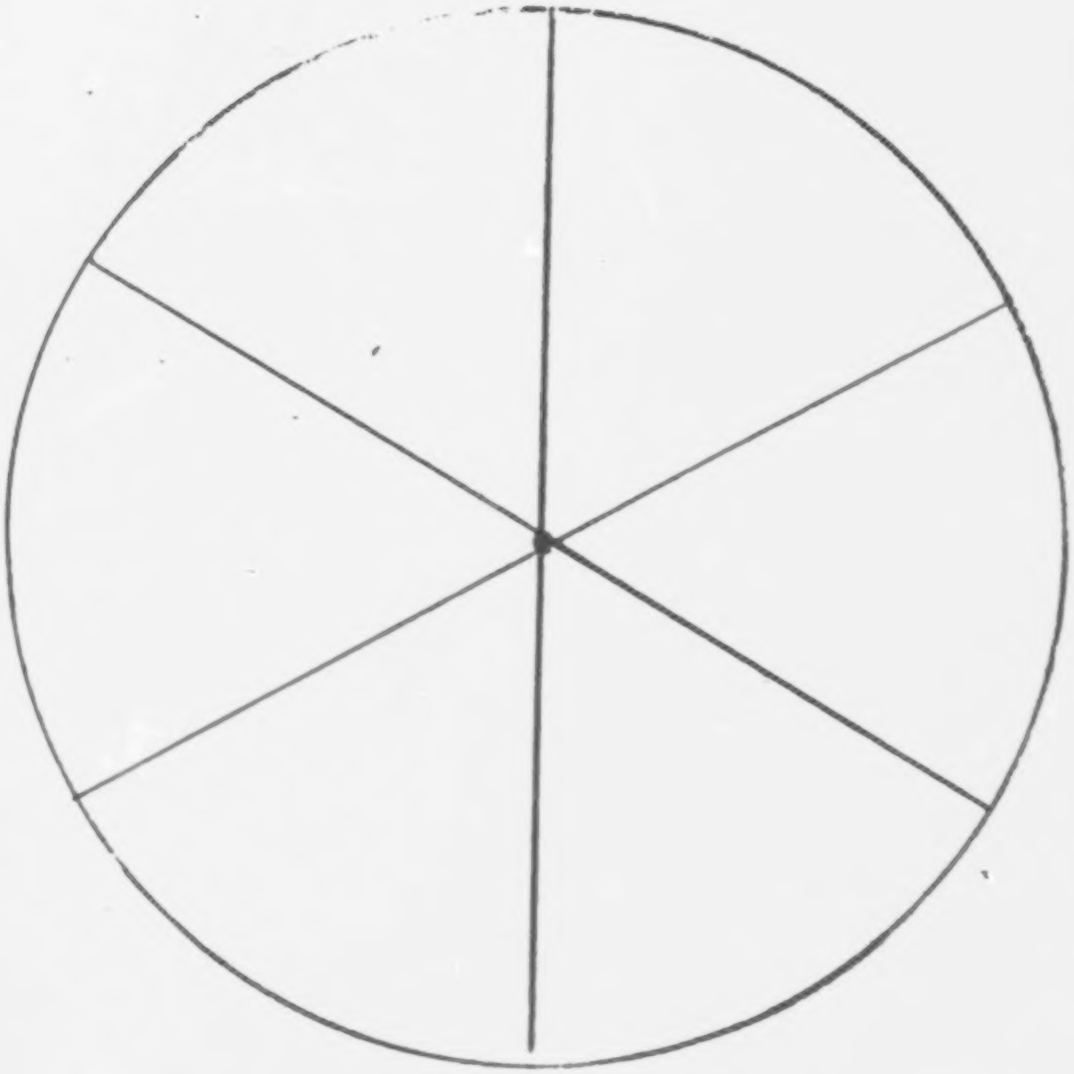
(2.5)

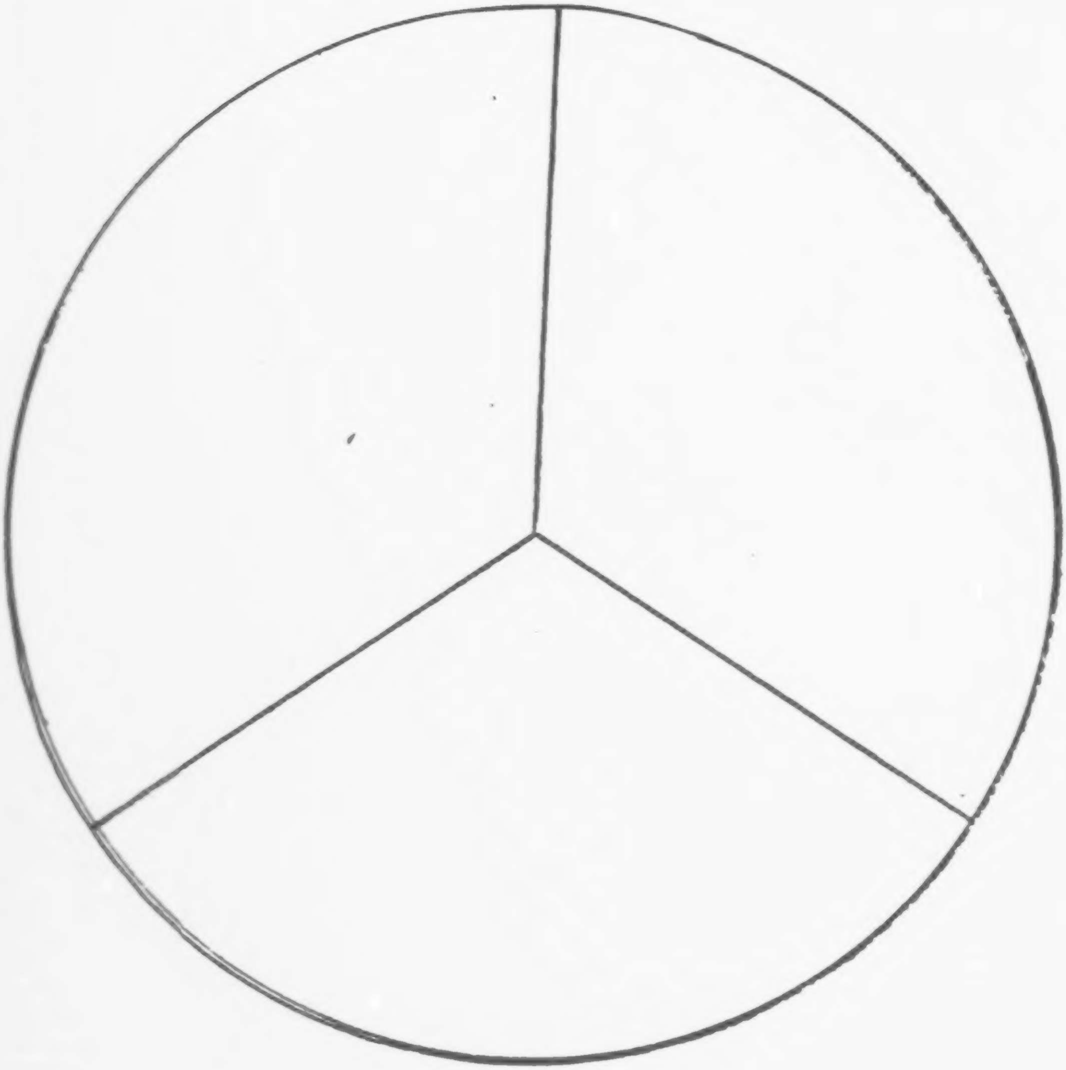
Group students into three groups. Have 1 group cut circles into thirds, one group cut circles into sixths, and one group cut circles into eighths. Each group will have 3 circles. have them illustrate improper fractions as whole numbers and as mixed numbers.

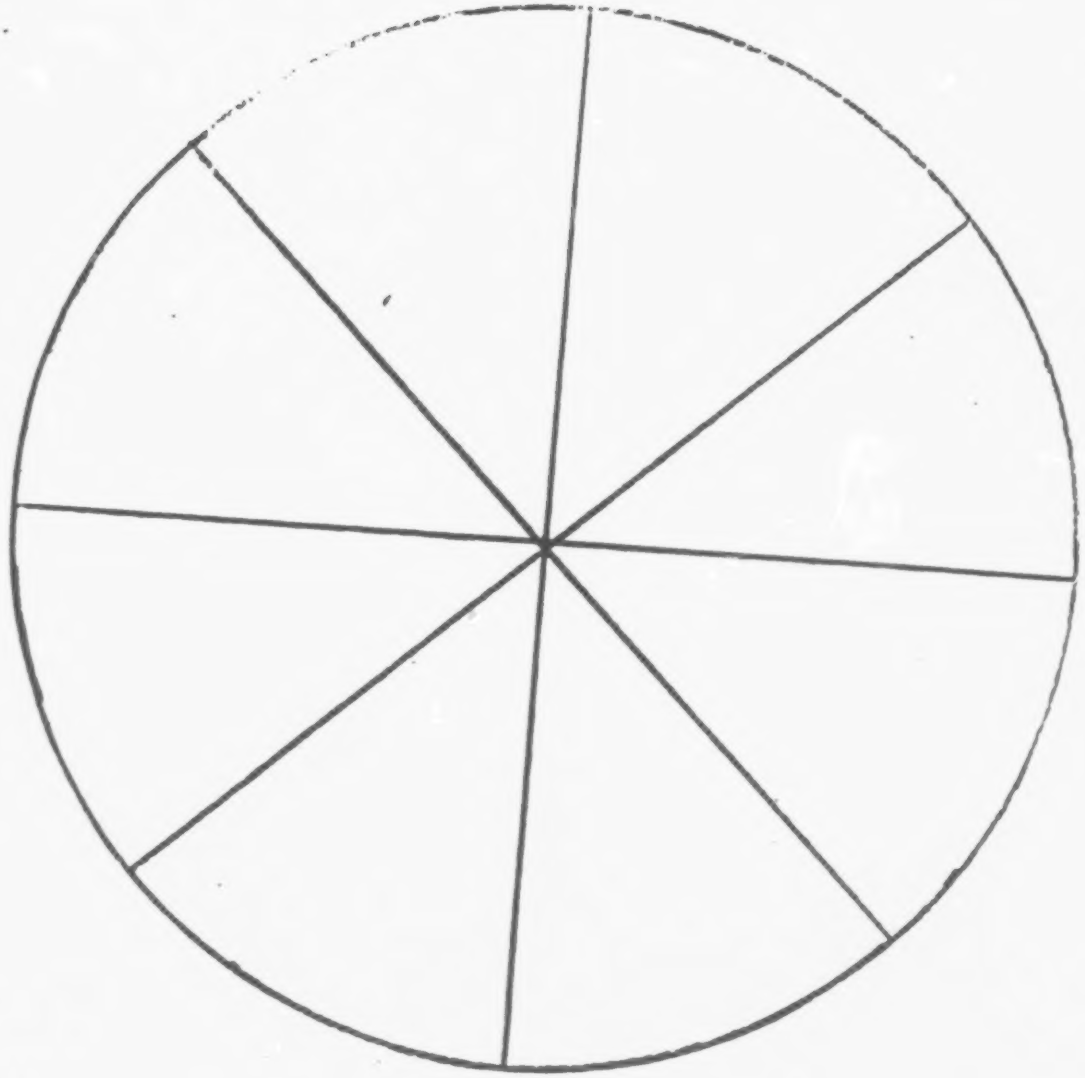
EX. 3/3 + 3/3 + 3/3 = 9/3 = 3

3/3 + 3/3 + 2/3 = 8/3 = 2 2/3

Illustrate the equivalence of the thirds and the sixths. Have students check to see if there is an equivalence with the eighths.







(2.6)

CHANGING MIXED NUMBERS TO IMPROPER FRACTIONS

To change a mixed number to an improper fraction you:

Step 1. Multiply the bottom number (denominator) by the whole number.

Step 2. Add the result to the top number (numerator).

Step 3. Place the total over the bottom number.

EX. 1 4 3/5

1. 4 X 5 = 20
2. 20 + 3 = 23 4 3/5 = 23/5
3. 23/5

EX. 2 6 7/8

1. 6 X 8 = 48
2. 48 + 7 = 55 6 7/8 = 55/8
3. 55/8

(2.5)

IMPROPER FRACTIONS AND MIXED NUMBERS

An improper fraction is a fraction where the numerator is as big as or bigger than the denominator. This makes an improper fraction equal to or greater than 1 whole.

Use a number line to show the equivalence of fractions to whole numbers. Mark the whole numbers 1-5 and have students fill in with thirds and sixths. Point out that 3/3 is the same as 1 and so on.

Suppose a group of people have two pies cut into 5 slices each. If seven people each have a slice of pie then 7/5 of the pie is eaten. 5/5 of one pie which is one whole pie and 2/5 of another.

5/5 + 2/5 = 7/5 = 1 2/5

To change 7/5 to a mixed number, divide the numerator by the denominator and write the remainder as a fraction over the denominator. Reduce the remaining fraction if necessary.

Guided Practice:

Change the following improper fractions:

45/9 26/8 30/7 12/3 33/6

(2.7)
Find equivalent fractions by expressing each fraction in the lowest terms or by using the cross product.

To express in the lowest terms:

$$\frac{6}{15} = \frac{6 \div 3}{15 \div 3} = \frac{2}{5}$$

$$\frac{6}{5} = \frac{4}{10}$$

$$\frac{4}{10} = \frac{4 \div 2}{10 \div 2} = \frac{2}{5}$$

Express each fraction in lowest terms.
If the resulting fractions are the same, the given fractions are equivalent.

Cross-Product Method.

$$\frac{9}{12} \times \frac{12}{16} \qquad \begin{array}{r} 9 \text{ X } 16 = 144 \\ 12 \text{ X } 12 = 144 \end{array} \qquad \frac{9}{12} = \frac{12}{16}$$

Multiply the numerator of the first fraction and the denominator of the second fraction.

Then multiply the numerator of the second fraction and the denominator of the first fraction.

If the products are equal, then the fractions are equivalent.

(2.7)

CHANGING FRACTIONS TO EQUIVALENT FRACTIONS

HAVING A COMMON DENOMINATOR

$\frac{5}{6}$ and $\frac{3}{8}$

$$\frac{5}{6} = \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$$

$$\frac{3}{8} = \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

1. Ask yourself, what is the least number that both denominators will divide into?
2. Ask yourself, what do you multiply the denominator by to get that number. Multiply both the numerator and denominator by that number.

5/6 is equivalent to 20/24

3/8 is equivalent to 9/24

These fractions share common denominators.

EX. Find the lowest common denominator. Change the fractions having that denominator.

3/8 and 9/10 5/6 and 1/2

(2.7a)

YARN ACTIVITY TO SHOW EQUIVALENCE OF FRACTIONS

Divide students into 4 groups. Give each group a 3 foot piece of yarn. Instruct each group to divide their yarn into equal pieces of given lengths.

Group 1 - thirds

Group 2 - fourths

Group 3 - halves

Group 4 - eights

Compare the equivalences found and those not found with the thirds.

(2.7p)

EQUIVALENT FRACTIONS - PRACTICE

Find an equivalent fraction by expressing in lowest terms.

1. 9/15   2. 12/9   3. 13/39   4. 18/63

Use the cross-product method to determine if two fractions are equivalent.

5. 4/9 , 3/7   6. 5/8 , 10/16

7. Which is larger 3/4 or 2/3?

8. Which is smaller 2/3 or 3/5?

Find the lowest common denominator. Change the fractions to equivalent fractions having that denominator.

9. 6/7 , 2/3

10. 7/10 , 3/4

(2.7p)

EQUIVALENT FRACTIONS - PRACTICE

ANSWER KEY

1. 3/5
2. 1 1/3
3. 1/3
4. 2/7
5. No
6. Yes
7. 3/4
8. 3/5
9. 18/21 , 14/21
10. 14/20 , 15/20

(2.8)

ADDING FRACTIONS WITH THE SAME DENOMINATOR

1. Add the numerators
2. Write a fraction with the sum of the numerators from Step 1 as the numerator and the denominator of the given fractions as the denominator.

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

3. Write the resulting fraction in simplest form.

ADDING FRACTIONS WITH DIFFERENT DENOMINATORS

1. Change each fraction to an equivalent fraction using the L.C.D.
2. Add as in steps above.

ADDING MIXED NUMBERS

1. Add the fractional parts.
2. Add the whole numbers parts.
3. Write the answer in simplest form.

SUBTRACTING FRACTIONS

1. If denominators are unlike, write equivalent fractions using the L.C.D.
2. Subtract the numerators.
3. Write a fraction with the difference from Step 2 as the numerator and the L.C.D. or the given denominator if denominators are the same as the denominator.

$$\frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$$

4. Write the resulting fraction in simplest form.

SUBTRACTING MIXED NUMBERS

1. If denominators of the fractional parts are unlike, write equivalent fractions using the L.C.D.
2. Subtract the fractional parts. If necessary, borrow 1 from the whole number part of the first mixed number, change it to an equivalent fraction using the L.C.D., and add it to the fractional part of the first mixed number.
3. Subtract the remaining whole numbers.
4. Write the answer in simplest form.

$$\begin{array}{lrcrcr} \text{EX.} & 2\ 1/3 & \longrightarrow & 2\ 5/15 & \longrightarrow & 1\ 20/15 \\ & \underline{-\ 1\ 3/5} & \longrightarrow & \underline{-\ 1\ 9/15} & \longrightarrow & \underline{-\ 1\ \ 9/15} \\ & & & & & 11/15 \end{array}$$

(2.8p)

ADDING AND SUBTRACTING FRACTIONS AND MIXED NUMBERS

PRACTICE

1. 7/15 + 3/15
2. 10 5/14 + 8 7/14
3. 5/9 + 2/3
4. 7 5/9 + 6 11/18
5. 7 2/3 + 3 1/2 + 9 5/6
6. 5/9 - 2/9
7. 23 5/6 - 7 1/6
8. 5/6 - 3/5
9. 5 2/3 - 3 4/7
10. 11 3/8 - 4 7/8

(2.8p)

ADDING AND SUBTRACTING FRACTIONS AND MIXED NUMBERS

PRACTICE - ANSWER KEY

1. 10/15 = 2/3
2. 18 6/7
3. 1 2/9
4. 14 1/6
5. 21
6. 1/3
7. 16 2/3
8. 7/30
9. 2 2/21
10. 6 1/2

(2.9)

MULTIPLYING FRACTIONS

Place the product of all numerators over the product of all denominators and reduce to lowest terms.

MULTIPLYING MIXED NUMBERS

Change all mixed or whole numbers to improper fractions and multiply the resulting fractions as in the rule above.

EX. $\frac{5}{7} \text{ X } \frac{2}{9} = \frac{5 \text{ X } 2}{7 \text{ X } 9} = \frac{10}{63}$

$\frac{2}{3} \text{ X } \frac{1}{3} \times \frac{5}{9} = \frac{2 \text{ X } 1 \text{ X } 5}{3 \text{ X } 3 \text{ X } 9} = \frac{10}{81}$

$3 \text{ X } \frac{4}{5} = \frac{3}{1} \text{ X } \frac{4}{5} = \frac{3 \text{ X } 4}{1 \text{ X } 5} = \frac{12}{5} = 2\ 2/5$

$3\ 5/7 \text{ X } 4\ 3/8 = \frac{26}{7} \text{ X } \frac{35}{8} = \frac{910}{56} = 16\ 14/56 = 16\ 1/4$

(2.10)
WRITING RECIPROCALS

To write the reciprocal of a fraction, exchange the numerator and denominator. This is called inverting the fraction.

DIVIDING FRACTIONS

To divide one fraction by another, invert the divisor (or second fraction) and multiply.

DIVIDING MIXED NUMBERS

Change any mixed or whole numbers to improper fractions and divide as stated above.

EX. 3/5 reciprocal is 5/3

EX. 3/5 ÷ 2/3 = 3/5 X 3/2 = 9/10

EX. 2 2/5 ÷ 3 1/2 = 12/5 ÷ 7/2 = 12/5 X 2/7 = 24/35

(2.10p)

MULTIPLYING AND DIVIDING FRACTIONS AND MIXED NUMBERS

PRACTICE

1. 2/3 X 3/7
2. 3/10 X 4/5
3. 4 2/3 X 15/16
4. 16 1/3 X 2 5/14
5. 4/9 X 3 3/4
6. 3/7 -- 2/5
7. 8/13 -- 6/7
8. 45 -- 9/10
9. 2 3/4 -- 5/8
10. 8 2/3 -- 5 1/12

(2.10p)
MULTIPLYING AND DIVIDING FRACTIONS AND MIXED NUMBERS

PRACTICE - ANSWER KEY

1. 6/21
2. 6/25
3. 4 3/8
4. 38 1/2
5. 1 2/3
6. 1 1/14
7. 28/39
8. 50
9. 4 2/5
10. 1 43/61

(2.11)

RULES OF ORDER (PMDAS)

Sometimes PEMDAS

Remember by: Please Excuse My Dear Aunt Sally

P - parenthesis

E - exponents

M - multiply

D - divide

A - add

S - subtract

This is the rule of order that should be followed when solving a problem with multiple operations.

EX. 2 3/5 ÷ 1 1/2 X 3 =

Step 1: Multiply 1 1/2 X 3 = 3/2 X 3/1 = 9/2

Divide 2 3/5 ÷ 9/2 = 13/5 ÷ 9/2 = 13/5 X 2/9 = 26/45

EX. Robert earns \$7.75 per hour. He worked 8 hours on Monday, 8 hours on Tuesday, and 10 hours on Wednesday. Write an expression that shows Robert's pay for the 3 days. Solve.

\$7.75 (8 + 8 + 10)

or 8(\$7.75) + *(\$7.75) + 10(\$7.75)

Either expression will work.

\$7.75 (26)

$$\begin{array}{r} \$7.75 \\ \underline{26} \\ 46\ 50 \\ \underline{155\ 0} \\ \$201.50 \end{array}$$

(2.12)

CULMINATING ACTIVITY

Give students an assignment to find at least 5 examples of how the operations studied are used on their job. Discuss and share with the class.

(2.13)

POST TEST - FRACTIONS

Solve and simplify.

1. 3/8 + 5/12
2. 1 1/4 - 2/3
3. 2 5/6 X 3
4. 3 -- 8 1/2
5. 1 3/4 + 9 2/3 - 3 1/4
6. 2/3 X 1/4 -- 3/5
7. How many yards of fabric should be added to 2/3 yard of fabric to make 6 yards?
8. If the neck opening of a lab coat is 5 1/2 inches and you add 8/4 inches to it, what is the size of the neck opening?
9. If Sharon had 6 3/4 bundles charted every day for 3 days, how many bundles did she finish in 3 days?
10. The sewing machine operators are divided into 6 teams. If each team is required to finish 27/30 of their job sewing coats, how much will be finished all together?

POST TEST - ANSWER KEY

1. 19/24
2. 7/12
3. 8 1/2
4. 6/17
5. 8 1/4
6. 5/18
7. 5 1/3 yards
8. 7 1/2 inches
9. 20 1/4
10. 5 2/5

MODULE: Measurement and Numerical Skills

GENERAL INSTRUCTIONAL OBJECTIVE: Utilize Occupational Specific Math **JOB TITLE:** Sewing Machine Operator

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
III.A.300 Upon completion, the student will be able to perform computations using decimals, including adding, subtracting, multiplying and dividing.	(1.1) Motivational Activity: Using a measuring tape and a number line, explain that decimals are numbers that fall between the integers. Group students and pass out decimal squares to model an exact amount.	Measuring tape Attachment 1.1a, 1.1b	Observation
	(1.2) Pre-test Decimal Computation	Attachment 1.2 Teacher-made pre-test	11-item pre-test
	(1.3) Pre-teach Vocabulary	Attachment 1.3	
	(1.4) Instructional Activity: Using a place value line, have students read and write the value of given decimals. Work through examples and assign practice sheet. Discuss.	Attachment 1.4 Reading/Writing Decimals Attachment 1.4p Practice Sheet Additional practice, Number Power 2 pp. 50-51	Observation
	(1.5) Instructional Activity: Discuss the rules of rounding. Work through examples. Have students work the practice sheet and discuss.	Attachment 1.5 Rounding Decimals Attachment 1.5p Practice Sheet	Observation

(1.6) Instructional Activity: Introduce comparing comparing decimals. Have students arrange lists of 4 decimals in order from least to greatest.	Attachment 1.6 Comparing Decimals Additional practice, Number Power 2 p.54	Observation
(1.7) Instructional Activity: Adding decimals. Using steps for "Building Problem Solving Skills" work through a word problem with students. Work additional examples on the board. Assign practice sheet and discuss.	Attachment 1.7 Adding Decimals Attachment 1.7p Practice Sheet Additional practice, Number Power 2 pp. 55, 56	Observation
(1.8) Instructional Activity: Subtracting Decimals Work through a word problem using the same problem solving method as with addition. Discuss examples and assign practice sheet. Discuss.	Attachment 1.8 Subtracting Decimals Attachment 1.8p Practice Sheet Additional Practice Number Power 2 pp. 57, 58	Observation
(1.9) Instructional Activity: Multiplying Decimals Using the 4-Step Method, work through application example with students. Discuss additional problems. Assign practice sheet and discuss when completed.	Attachment 1.9 Multiplying Decimals Attachment 1.9p Practice Sheet Additional Pra Number Power 2 pp. 59-61, 63	

(1.10) Instructional Activity: Dividing Decimals Using the 4-step method, work through application example. Discuss additional problems. Assign practice sheet and discuss when completed.	Attachment 1.10 Dividing Decimals Attachment 1.10p Practice Sheet Additional practice, Number Power 2 pp. 64-69	
(1.11) Culminating Activity: Timesheet Information Act. Have students work in pairs and compute time worked from gum sheets. Using worksheet, have them compute other times which will apply all computation skills. See Attachment. Discuss calculating earnings based on production.	Attachment 1.11 Gum Sheets Attachment 1.11a Pridecraft Incentive Payroll	Observation
(1.12) Post-test Administer Post-test Review if necessary.	Attachment 1.12 Teacher-made post-test	10 item post-test

WORKPLACE LESSON PLAN

Job Title: Sewing Machine Operator

Module: Math

General Instructional Objective: Utilize Occupational Specific Math.

Specific Instructional Objective: Upon completion, the student will be able to perform computations using decimals, including adding, subtracting, multiplying and dividing.

MOTIVATIONAL ACTIVITY:

Using a measuring tape and a number line, explain that decimals are numbers that fall between the integers. Group students and have them model decimal amounts using decimal squares.

PRE-TEST on Decimal Computations.

PRE-TEACH VOCABULARY - Have students define, discuss.

INSTRUCTIONAL ACTIVITIES:

Using a place value line, have students read and write the value of given decimals. Work through examples and assign practice sheet. Discuss.

Discuss the rules of rounding. Work through examples. Have students work the practice sheet and discuss.

Introduce comparing decimals. Have students arrange lists of 4 decimals in order from least to greatest.

Adding Decimals - Using steps for "Building Problem Solving Skills" work through a word problem with students. Work additional examples on the board. Assign practice sheet and discuss.

Subtracting Decimals - Work through a word problem using the same problem solving method as with addition. Discuss examples and assign practice sheet. Discuss.

Multiplying Decimals - Using the 4-step method, work through application example with students. Discuss additional problems. Assign practice sheet and discuss.

Dividing Decimals - Using the 4-step method, work through application example. Discuss additional problems. Assign practice sheet and discuss.

CULMINATING ACTIVITY:

Time Sheet Information Activity - Have students work in pairs and compute time worked from gum sheets. Using work sheet, have them compute other times which will apply all computation skills. See Attachment.

POST-TEST - Administer teacher-made post-test. Review if necessary.

(1.1)

MOTIVATIONAL ACTIVITY

DECIMALS

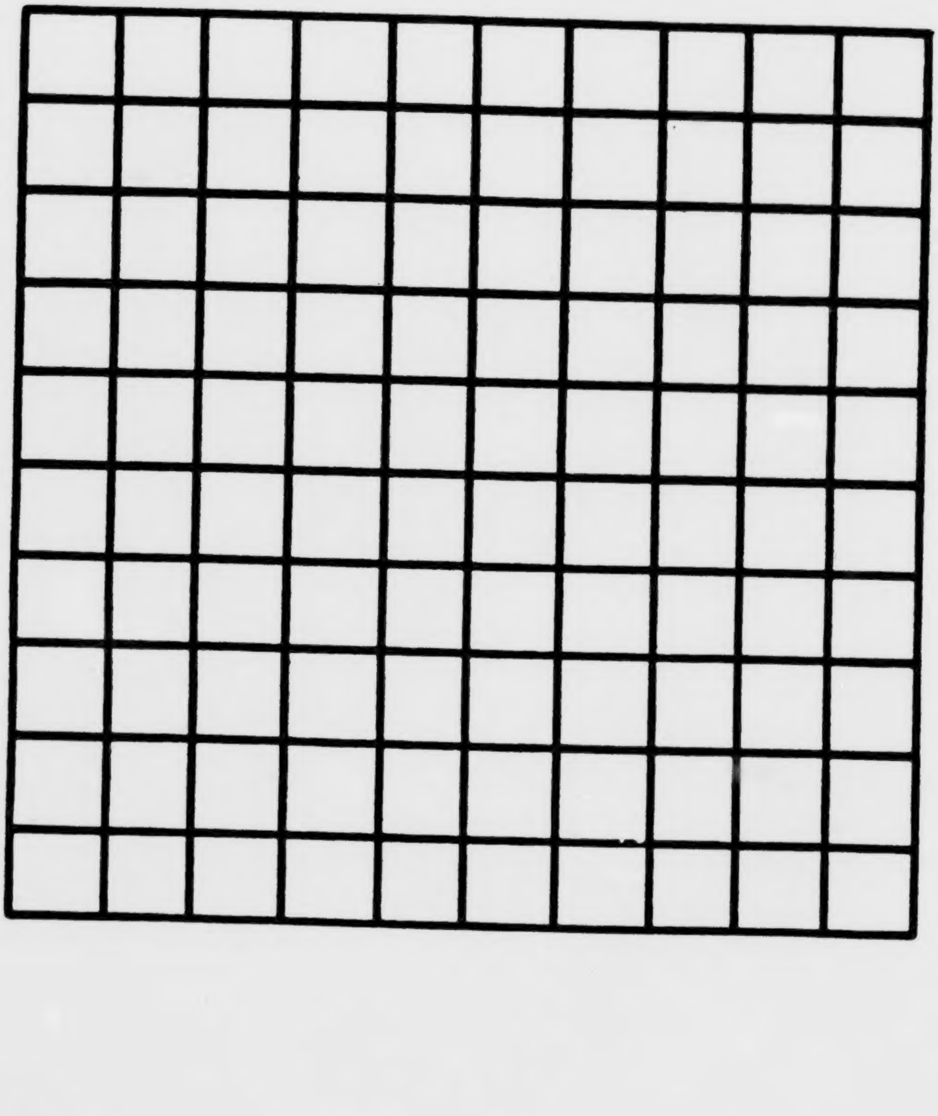
Show students a measuring tape and draw a number line on the board with two consecutive numbers marked. Expain that these numbers and the numbers marked on the measuring tape are integers. These describe only the points marked, not the numbers between the points. Have students name some points between the marks.

Divide the class into groups, pass out copies of decimal square, tenths and hundredths. Have students select the model that shows tenths and mark off 3 tenths. Have them mark 36 hundredths on the model that shows hundredths.

Now have one student mark off 48 hundredths and one mark off 69 hundredths. Compare with the 36 hundredths.

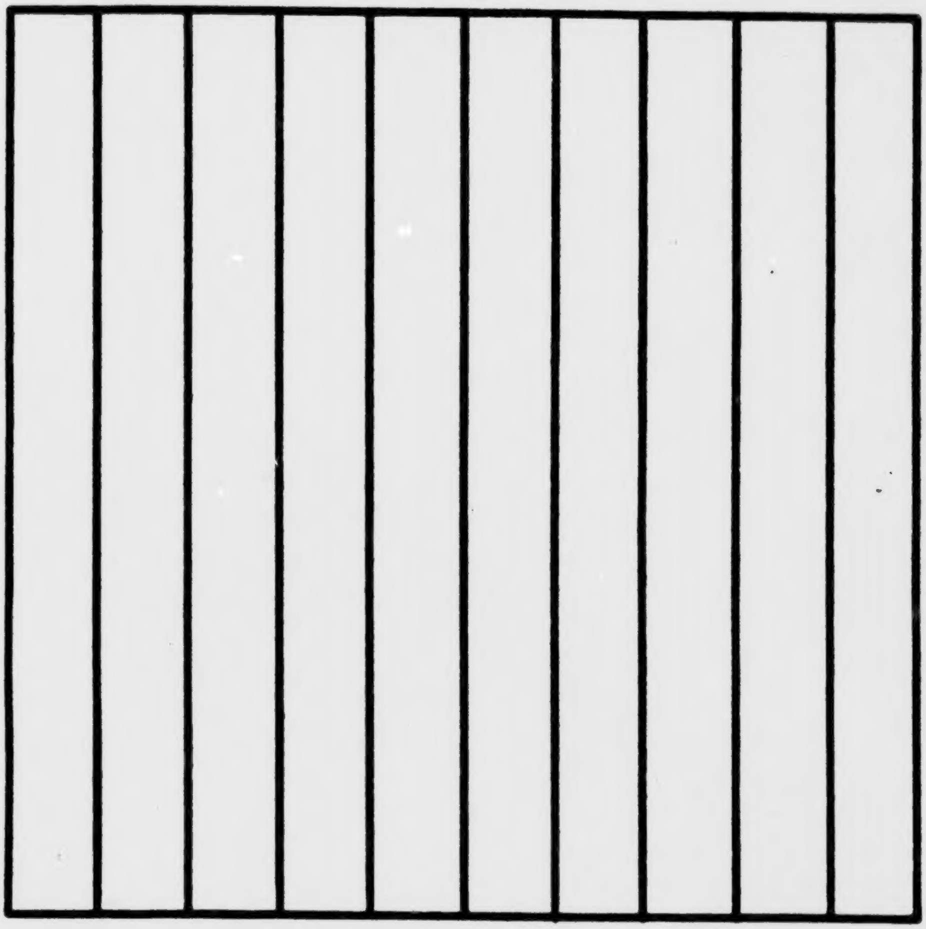
(1.1a)

DECIMAL SQUARES - HUNDREDTHS



(1.1b)

DECIMAL SQUARES - TENTHS



(1.2)

PRE-TEST DECIMALS

Write the following decimals in words.

1.) .9

2.) .034

3.) .3577

4.) 4.08

Write the following as a decimal or mixed number.

5.) eighty-five thousandths

6.) two hundred fifty and six tenths

Compare the following; write from least to greatest.

7.) 2.093, 2.0935, 1.934, 0.987

8.) Add. 123 + 2.7 + 8.64

9.) Subtract. .08 - .003

10. Multiply. .551 X 6

11. Divide. $5.3\overline{)4.399}$

(1.2)

ANSWER KEY

DECIMAL PRE-TEST

1. nine tenths
2. thirty four thousandths
3. three thousand five hundred seventy-seven ten thousandths
4. four and eight hundredths
5. 0.085
6. 250.6
7. 0.987, 1.934, 2.093, 2.0935
8. 134.34
9. 0.077
10. 3.306
11. 0.83

(1.3)

VOCABULARY

Round

Addend

Sum

Difference

Product

Factors

Dividend

Divisor

Quotient

(1.4)

READING AND WRITING DECIMALS

Hundreds	Tens	Ones	And or Point	Tenths	Hundredths	Thousandths	Ten Tousandths	Hundred Thousandths	Millionths
		0	.	7	3	4			

READ .734

Read the digits as for a whoe number. Then name the place value of the last digit.

0.005 5 thousandths
or zero. zero zero five

WRITE the following in standard (decimal) form:

seven tenths (.7)

zero point four nine two (0.492)

four hundred and three hundred fifty three thousands (400.353)

seventy-six and eight ten thousandths (76.0008)

(1.4p)

READING AND WRITING DECIMALS

PRACTICE

Read (or write in words)

1. a.) 0.8 b.) 0.02 c.) 0.64

2. a.) 1.6 b.) 0.852 c.) 126.4

3. a.) 7.37 b.) 89.03 c.) 0.0081

Write each of the following in standard form.

4. a.) Nine thousandths
   b.) Four and eight tenths
   c.) One hundred nine and eighty-four hundredths

5. a.) Eight hundred forty-two hundred-thousandths
   b.) Five hundred nineteen point nine
   c.) Ninety-four ten-thousandths

(1.4p)

READING/WRITING DECIMALS

ANSWER KEY

1. a) eight tenths
   b) two hundredths
   c) sixty-four hundredths

2. a) one and six tenths
   b) eight hundred fifty-two thousandths
   c) one hundred twenty-six and four tenths

3. a) seven and thirty-seven hundredths
   b) eighty-nine and three hundreths
   c) eighty-one ten thousandths

4. a) .009
   b) 4.8
   c) 109.84

5. a) 0.0094
   b) 519.9
   c) 0.0094

(1.5)

ROUNDING DECIMALS

Round $.47 to the nearest dime.

Step 1) Locate the place to be rounded $.47 (the four is in the tenths place.)

Step 2) If the digit to the right of the underlined value is 5 or more, round to the next higher digit. If it is less than 5, the underlined value stays the same.

$.\underline{4}7$ --> .50 $7 > 5$
$.\underline{4}4$ --> .40 $4 < 5$

Round $0.83\underline{2}49$ to the nearest thousandth

Since $4 < 5$ we have 0.832 (omit all digits to the right of the place to be rounded.)

(1.5p)

ROUNDING DECIMALS

PRACTICE

Round each of the following to the nearest

Tenth:

1. a) 0.25 b) 0.87 c) 0.984 d) 2.39

Hundredth:

2. a) 0.517 b) 0.308 c) 5.845 d) 15.2263

Thousandth:

3. a) 0.2146 b) 0.3998 c) 3.0815 d) 16.76876

Ten-Thousandth:

4. a) 0.20585 b) 0.932473 c) 4.00619 d) 43.020471

Hundred-Thousandth:

5. a) 0.000083 b) 0.005142 c) 1.079324 d) 83.591243

Cent:

6. a) $.267 b) $.59 c) $1.316 d) $5.8682

Whole Number:

7. a) 6.3 b) 19.4 c) 2.09 d) 34.28

Dollar:

8. a) $5.69 b) $37.90 c) $420.71 d) $19.53

(1.5p)

ANSWER KEY

ROUNDING DECIMALS

1 a) 0.3
b) 0.9
c) 1.0
d) 2.4
2 a) 0.52
b) 0.31
c) 5.85
d) 15.23
3 a) 0.215
b) 0.400
c) 3.082
d) 16.769
4 a) 0.2059
b) 0.9325
c) 4.0062
d) 43.0205

5 a) 0.00008
b) 0.00514
c) 1.07932
d) 83.59124
6 a) $.27
b) $.59
c) $1.32
d) 5.87
7 a) 6
b) 19
c) 2
d) 34
8 a) $6.00
b) $38.00
c) $421.00
d) $20.00

(1.6)

COMPARING DECIMALS

Which is more?

0.3 pound of cheese, or 0.03 pound of cheese.

0 . 3
0 . 0 3
↓ ↓
Same 3>0

(To compare decimals, compare the digits in each place starting at left. Since 3 > 0, then 0.3 > 0.03

Which is less?

1.765 or 1.76.

1. 7 6 5
1. 7 6 0
↙ ↓ ↘ ↘
same same same 0 < 5

(Write a zero to make the same number of decimal places if needed.)

Arrange in order from least to greatest.

0.635, 0.65, 6.1, 0.069

0.635
0.65
6.1
0.069

In the ones 6 > 0, so 6.1 is the greatest
in the tenths. 0 < 6, so 0.069 is the least
in the hundredths, since 3 < 5, 0.635 < 0.65.

0.069, 0.635, 0.65, 6.1

Have the students arrange the following in order from least to greatest:

.106, .16, .061, .6

(1.7)

ADDING DECIMALS

Building Problem Solving Skills

On April 5, a sewing machine operator posted gum labels for 23.017 minutes, 19.173 minutes, 22.527 minutes, and 17.249 minutes. What was the total minutes for the day?

1. READ the problem carefully.

   a. Find the question asked. What was the total minutes for the day?

   b. Find the given facts. Posted gum labels for 23.017 minutes, 19.173 minutes, 22.527 minutes, and 17.249 minutes.

2. PLAN how to solve the problem.

   a. Choose the operation needed. The word total with unequal quantities indicates addition.

   b. Think or write out your plan relating the given facts to the question asked. The sum of 23.017 minutes, 19.173 minutes, 22.527 minutes, and 17.249 minutes is equal to the total minutes for the day.

3. SOLVE the problem.

   a. Estimate the answer.

```
    23.017      --->     23
    19.173      --->     19
    22.527      --->     23
  + 17.249      --->   + 17
  --------             ----
                         82
```

(Round each decimal to the nearest whole number and add. The answer should be about 82.)

   b. Solution.

```
    23.017
    19.173
    22.527
  + 17.249
  --------
    81.966
```

(Arrange in a column lining up the decimal points. Add, starting from the right. Place the decimal point in the sum below the decimal point in the addends.

Work through additional examples with students.

Ex.1)

$$\begin{array}{r} 0.31 \\ 6\,\overline{)\,1.86} \\ \underline{1\,8} \\ 6 \\ \underline{6} \end{array}$$

(When the divisor is a whole number, write the decimal point in the quotient directly above the decimal point in the dividend. Then divide as you do with whole numbers.)

Ex.2) $\$8.50 \div 4$

$$\begin{array}{r} \$2.125 \\ 4\,\overline{)\,8.500} \\ \underline{8} \\ 5 \\ \underline{4} \\ 10 \\ \underline{8} \\ 20 \\ \underline{20} \end{array}$$

(If necessary write zeros in the dividend. When dividing with cents carry out the division to the thousandths place and round to the nearest cent.)

Ex.3) $35.6 \div 0.4$

$$\begin{array}{r} 8\;9. \\ 0.4\,\overline{)\,35.6} \\ \underline{32} \\ 3\;6 \\ \underline{3\;6} \\ 0 \end{array}$$

(To make the divisor a whole number, move the decimal point one place to the right. Move the decimal point in the dividend the same number of places.)

Ex.4) $0.0015 \div 0.05$

$$\begin{array}{r} 0.03 \\ 0.05\,\overline{)\,0.00\,15} \\ \underline{15} \\ 0 \end{array}$$

Ex.5) $0.625\;\overline{15}$

$$\begin{array}{r} 24. \\ 0.625\,\overline{)\,15.000} \\ \underline{12\;50} \\ 2\;500 \\ \underline{2\;500} \\ 0 \end{array}$$

(If necessary, write zeros in the dividend so that the dividend has at least as many places as the divisor.)

4. CHECK.

a. Check the accuracy of your arithmetic and compare your answer to the estimate. The answer 81.961 minutes compares reasonably with the estimate of 82 minutes.

"BUILDING PROBLEM SOLVING SKILLS"

4 - STEP PLAN

1. Read the problem carefully.
    a. Find the question asked.
    b. Find the given facts.
2. Plan how to solve the problem.
    a. Choose the operation needed.
    b. Think or write out your plan.
3. Solve the problem.
    a. Estimate the answer.
    b. Find the solution.
4. Check.
    a. Check the accuracy.
    b. Compare to the estimate.

(1.7p)

PRACTICE WITH DECIMALS

Ex.) Add 0.7 + 3.46

$$\begin{array}{r} 3.46 \\ \underline{+\ 0.70} \\ 4.16 \end{array}$$

(Write ending zeros so both addends have the same number of decimal places. Be sure to line up your decimal points.)

Ex.) 53 + 0.375

$$\begin{array}{r} 53.000 \\ \underline{+\ \ 0.375} \\ 53.375 \end{array}$$

(When adding whole numbers and decimals place a decimal point after each whole number.)

Have students solve. Walk around and check for accuracy.

Find the sum: 0.423; 5.17; 3; and 3.4.

$$\begin{array}{r} 0.423 \\ 5.170 \\ 3.000 \\ \underline{+\ 3.400} \\ 11.993 \end{array}$$

(1.7p)

ADDING DECIMALS

PRACTICE

Add the following:

1. 0.5 + 0.8 + 0.4 =
2. 0.57 + 0.04 + 0.18 =
3. 3.26 + 2.15 =
4. 6.74 + 9.3 + 1.87
5. 0.94 + 7 + 0.8 =
6. 1.4 + 0.7 + 0.29 + 2.45
7. 1.516 + 6.24 + 0.006 + 4.518 =
8. 3.9 + 0.49 + 6 + 0.57 =
9. 0.36 + 4.68 + 0.2 + 9.0 + 1.7 =
10. 335.48 + 618.37 + 407.54 + 250.36 + 195.83 =
11. Janet can insert 48 sleeves in 22.176 minutes. It took Ruth 5.381 minutes more to do the same job. How long did it take Ruth?
12. The shipping department weighed 5 boxes. They weighed 2.3 pounds; 3.71 pounds; 1.872 pounds; 2.683 pounds; and 3.94 pounds. What was the total weight of the boxes?

(1.7p)

ADDING DECIMALS

ANSWER KEY

1. 1.7
2. 0.79
3. 5.41
4. 17.91
5. 8.74
6. 4.84
7. 12.280
8. 10.96
9. 15.94
10. 1807.58
11. 27.557
12. 14.505

(1.8)

SUBTRACTING DECIMALS

A sewing machine operator clocked 432.715 minutes Monday and 478.249 minutes Tuesday. How many more minutes did the operator work on Tuesday?

Follow the 4 steps from our lesson on addition to solve. (Work through this problem with students.)

1. Read the problem carefully.
   a. Find the question.
   b. Find the given facts.

2. Plan how to solve the problem.

   a. Choose the operation needed.

   b. Think or write out your plan.

   *c. Express your plan as an equation.

3. Solve the problem.

   a. Estimate the answer.

   b. Find the solution.

4. Check.

   a. Check the accuracy.

   b. Compare to the estimate.

Work through the examples on the board.

Ex.1) Subtract: 0.513 - 0.421

$$\begin{array}{r} 0.513 \\ -\ 0.421 \\ \hline 0.092 \end{array}$$

Ex. 2) From 10.6 subtract 5.524.

$$\begin{array}{r} 10.600 \\ -\ 5.524 \\ \hline 5.076 \end{array}$$

Ex. 3) Find the difference: 5.61 - 0.9

$$\begin{array}{r} 5.61 \\ -\ 0.90 \\ \hline 4.71 \end{array}$$

Ex.4) Subtract: \$20 - \$6.38

$$\begin{array}{r} \$20.00 \\ -\ \ 6.38 \\ \hline \$13.62 \end{array}$$

(1.8p)

SUBTRACTING DECIMALS

PRACTICE

1. 0.83 - 0.36 =
2. 9.3 - 1.9 =
3. 9.01 - 7.84 =
4. 9.786 - 8.895 =
5. 7 - 2.84 =
6. 4.9 - 0.807 =
7. 0.685 - 0.5903 =
8. $.78 - $0.09 =
9. A lab coat measures 41.5 inches long for an XLG and 38.25 inches long for an XS. What is the difference in the length of the two coats?
10. Operator number 33 finished 3 bundles in 54.627 minutes. It took operator number 17, 48.371 minutes to finish the same task. How much longer did it take operator 33 than operator 17 to finish 3 bundles?

(1.8p)

SUBTRACTING DECIMALS

ANSWER KEY

1. 0.47
2. 7.4
3. 1.17
4. 0.891
5. 4.16
6. 4.093
7. 0.0947
8. $.69
9. 3.25 inches
10. 6.256 minutes

(1.9)

MULTIPLYING DECIMALS

Solve using the 4 step method.

A bundle of scrub pants has 48 pieces each weighing 0.9 pounds. What is the total weight of the bundle?

Work through the 4 steps with students - at step 3.

a.) Estimate

$$\begin{array}{rcr} 48 & \dashrightarrow & 50 \\ \underline{\times\ 0.9} & \dashrightarrow & \underline{\times\ 1} \\ & & 50 \end{array}$$

(Round to the nearest ten.
Round to the nearest whole number.
Multiply.)

b.) Solution

$$\begin{array}{rl} 4\ 8 & \longleftarrow \text{0 decimal places} \\ \underline{\times\ \ 0.9} & \longleftarrow \text{1 decimal place} \\ 4\ 3\ 2 & \\ \underline{0\ 0} & \\ 4\ 3\ 2 & \longleftarrow \text{1 decimal place} \end{array}$$

(Multiply as you do with whole numbers.)

(The number of decimal places in the product is the sum of the number of decimal places in the factors.)

(Work through examples on the board.)

Ex. 1) 43 X 2.6

$$\begin{array}{r l}
43 & \text{<--- 0 decimal places} \\
\text{X}\ \ 2.6 & \text{<--- 1 decimal place} \\
\hline
258 & \\
86 & \\
\hline
111.8 & \text{<--- 1 decimal place}
\end{array}$$

Ex. 2) 0.12 x 0.4

$$\begin{array}{r l}
0.12 & \text{<--- 2 decimal places} \\
\text{X}\ \ 0.4 & \text{<--- 1 decimal place} \\
\hline
048 & \\
000 & \\
\hline
0.048 & \text{<--- 3 decimal places}
\end{array}$$

Ex. 3) 2.43 X 0.56

$$\begin{array}{r l}
2.43 & \text{<--- 2 decimal places} \\
\text{X}\ 0.56 & \text{<--- 2 decimal places} \\
\hline
1458 & \\
1215 & \\
000 & \\
\hline
1.3608 & \text{<--- 4 decimal places}
\end{array}$$

(1.9p)

MULTIPLYING DECIMALS

PRACTICE

1.) 4 X 0.1

2.) 12 X 9.8

3.) 246 X 0.625

4.) 0.05 X 17

5.) 1.15 X 5.2

6.) 5.93 X 0.87

7.) 2.14 X 0.03

8.) 0.95 X 20

9.) 0.02 X 0.02

10.) Celia wants to complete her work at production which is 480 minutes. Her gum sheets show 12 labels for 21.693 minutes and 11 labels for 19.325 minutes. How many total minutes did Celia clock?

(1.9p)

ANSWER KEY

MULTIPLYING DECIMALS

1. 0.4
2. 117.6
3. 153.75
4. 0.85
5. 5.98
6. 5.1591
7. 0.0642
8. 19
9. 0.0004
10. 472.891

(1.10)

DIVIDING DECIMALS

The Medical Center ordered 3 dozen scrub shirts for $466.20. What was the cost of 1 shirt?

(Work through the 4 step process with students to solve.)

$466.20 ÷ 36 = n

3a) Estimate

466.20 ---> 480 (round the dividend to the nearest multiple of the divisor.)

36 ---> 40

480 ÷ 40 = 12

```
            $ 12.95
b)  36  )$466.20
          36
          106
           72
           342
           324
            180
            180
              0
```

4) <u>Check</u> by multiplying.

```
  $ 12.95
    X  36
    77 70
   388 5
  $466.20 ✓
```

Work through additional examples with students.

Ex.1)

$$\begin{array}{r} 0.31 \\ 6\overline{)1.86} \\ \underline{1\ 8} \\ 6 \\ \underline{6} \end{array}$$

(When the divisor is a whole number, write the decimal point in the quotient directly above the decimal point in the dividend. Then divide as you do with whole numbers.)

Ex.2) $\$8.50 \div 4$

$$\begin{array}{r} \$2.125 \\ 4\overline{)8.500} \\ \underline{8} \\ 5 \\ \underline{4} \\ 10 \\ \underline{8} \\ 20 \\ \underline{20} \end{array}$$

(If necessary write zeros in the dividend. When dividing with cents carry out the division to the thousandths place and round to the nearest cent.)

Ex.3) $35.6 \div 0.4$

$$\begin{array}{r} 8\ 9. \\ 0.\underset{\curvearrowright}{4}\overline{)35.\underset{\curvearrowright}{6}} \\ \underline{32} \\ 3\ 6 \\ \underline{3\ 6} \\ 0 \end{array}$$

(To make the divisor a whole number, move the decimal point one place to the right. Move the decimal point in the dividend the same number of places.)

Ex.4) $0.0015 \div 0.05$

$$\begin{array}{r} 0.03 \\ 0.\underset{\curvearrowright}{05}\overline{)0.\underset{\curvearrowright}{00}15} \\ \underline{15} \\ 0 \end{array}$$

Ex.5) $0.625\overline{)15}$

$$\begin{array}{r} 24. \\ 0.\underset{\curvearrowright}{625}\overline{)15.\underset{\curvearrowright}{000}} \\ \underline{12\ 50} \\ 2\ 500 \\ \underline{2\ 500} \\ 0 \end{array}$$

(If necessary, write zeros in the dividend so that the dividend has at least as many places as the divisor.)

(1.10p)

DIVIDING DECIMALS

PRACTICE

1. 6.9 ÷ 3 =
2. 86.1 ÷ 7 =
3. 11.688 ÷ 24 =
4. 0.228 ÷ 6 =
5. 36 ÷ 1.8 =
6. 43.74 ÷ 1.8 =
7. 0.68 ÷ 0.04 =
8. 176.7 ÷ 0.3 =
9. 14 ÷ 5.6 =
10. A roll of fabric is 49.5 meters long. It is to be cut into pieces 0.45 meters long. How many such pieces can be cut from the roll?

(1.10p)

ANSWER KEY

DIVIDING DECIMALS

1. 2.3
2. 12.3
3. 0.487
4. 0.038
5. 20
6. 24.3
7. 17
8. 589
9. 2.5
10. 110 pieces

(1.11)

CULMINATING ACTIVITY

Time Sheet Information Activity.

Have students work in pairs and compute time worked from gum sheets. Using a worksheet, have them compute other times which will apply all computation skills.

See attachment.

(1.11)

TIME SHEET INFORMATION ACTIVITY

1. Find the total time that Sew Insew worked on 3-21-94.
2. If Sew Insew only worked that amount in 3 days, what was her time each day if they were all the same?
3. Ima Wiz worked on two tasks March 21. What was the total time that Ima worked? Show your steps.
4. If Ima had to decrease that time by 17.473, what would her time be?
5. a. Round the minutes on Ima's sheet labeled to sew plackets to the nearest tenth.

   b. Round the minutes labeled to tack plackets to the nearest hundredth.

(1.11)

ANSWER KEY

TIME SHEET ACTIVITY

1. 256.896
2. 85.632
3. 97.295 + 144.17 = 241.465
4. 223.992
5. a. 19.5

   b. 28.83

(1.11a)

Calculating Earnings Based on Production
(This does not include guaranteed pay)

Assume there are 12 tickets on a gum sheet each having 21.408 min.

(There is no clock off time)

(The operator's skill level (hourly rate) is $5.30)

1) $\begin{array}{r} 21.408 \\ \underline{\times\ 12} \\ 256.896 \end{array}$ (Total number of minutes worked that day)

2) $\dfrac{256.896}{480}$ (Total number of minutes in work day)-subtract clock off time if any.

= .5352 = 54% production

3) Multiply the rate of production by the skill level.

.5352 x $5.30 = 2.83656 = $2.84 per hour

4) $2.84 x 8 hrs worked = $22.72

(1.12)

COMPUTING DECIMALS

POST-TEST

1. Read or write 3.09 in words.
2. Write Eighteen and twenty-three thousandths in standard form.
3. Which is greater 0.495 or 0.5?
4. 0.36 + 0.87 + 0.74 + 0.29 =
5. 13.7 + 2.94 + 15 + 9.2 =
6. 2.443 - 1.97 =
7. 174.3 X 2.9 =
8. 11.036 -- 0.31 =
9. If Ron spreads 357.27 meters of fabric 25 ply high, how long will the spreads be?
10. Janet made $125.73, $97.29, $108.78, and $132.61 four consecutive weeks in May. What was her total pay for May?

(1.12)

ANSWER KEY

POST-TEST COMPUTING DECIMALS

1. Three and nine hundredths
2. 18.023
3. 0.5
4. 2.26
5. 40.84
6. 0.473
7. 505.47
8. 35.6
9. 14.2908
10. $464.41

JG

MODULE: Measurement and Numercial Skills

GENERAL INSTRUCTIONAL OBJECTIVE: Utilize Occupational Specific Math **JOB TITLE:** Sewing Machine Operator

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
III.A.400 The student will be able to solve problems using percents, including writing percents as decimals, decimals as percents, percents as fractions, fractions as percents, finding a percent and finding a number when a percent is given.	1.1 Motivational Activity: Students will browse through newspapers to find ads or articles pertaining to percents. Students will find at least 2-3 different illustrations. Discuss and compare.	Attachment 1.1 Newspapers	Observation
	1.2 Give a pretest to check for student knowledge of topic.	Attachment 1.2 Instructor-made pretest	15 item pretest
	1.3 Teach Vocabulary	Attachment 1.3	
	1.4 Discuss percents, writing percents as decimals, decimals as percents, percents to fractions and fractions to percents. Work through examples. Review rules. Assign practice sheet and discuss.	Attachments 1.4 - 1.4.6 Lecture Notes Attachment 1.4p Practice Sheet	Observation
	1.5 Mini lecture on finding a percent. Explain how to write an equation and solve for p. Discuss examples. Assign and discuss practice	Attachment 1.5 Attachment 1.5p	Observation

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sheet.		
1.6 Mini lecture on finding a number when a percent is given. Work through examples with students. Explain how to find a percent of a number. Assign practice sheet and discuss.	Attachment 1.6.1, 1.6.2 Lecture Notes Attachment 1.6p Practice Sheet	Observation
1.7 Culminating Activity: Have students complete a survey on percentages. They will find percentages of employees to total employees in different areas. Compare using graphs.	Attachment 1.7	Observation
1.8 Administer post test. Reteach as required.	Attachment 1.8 Instructor-made post test	15 item post test

WORKPLACE LESSON PLAN

Job Title: Sewing Machine Operator

Module: Mathematics

General Instructional Objective: Utilize Occupational Specific Math

Specific Instructional Objective: The student will be able to solve problems using percents, including writing percents as decimals, decimals as percents, percents as fractions, fractions as percents, finding a percent and finding a number when a percent is given.

MOTIVATIONAL ACTIVITY:

Have students browse through newspapers to find ads or articles pertaining to percents. Try to find at least 2-3 different illustrations. Make a display if possible of some of the illustrations. Have students rewrite the percents as ratios and decimals. Discuss the results.

ADMINISTER PRETEST.

PRETEACH VOCABULARY.

INSTRUCTIONAL ACTIVITIES:

Discuss the different ways that numbers are expressed in hundredths. Begin with writing percents as decimals. Introduce the rule and work through examples. Discuss writing decimals as percents and illustrate the rule. Also discuss writing percents as fractions and fractions as percents. Work through examples and discuss the rules. Assign practice sheet and discuss when completed.

Mini-lecture on finding a percent. Explain how to write an equation and solve for p. with p = percent. Discuss examples. Assign the practice sheet and discuss when completed.

Mini lecture on finding a number when a percent of it is given. Discuss the rule and work through examples with students. Explain how to find a percent of a number. Assign the practice sheet and discuss when completed.

CULMINATING ACTIVITY:

Have students complete a survey on percentages. They will find percentages of employees to total employees in different areas. Students will then make a graph (circle and bar) and compare the results.

ADMINISTER POST TEST. Reteach as required for mastery.

1.1

MOTIVATIONAL ACTIVITY

Bring in some newspapers. Have students browse the paper to find ads or articles pertaining to percents. Try to find at least 2-3 different illustrations. Make a display if possible of some of the illustrations. Have students rewrite the percents as ratios and decimals. Discuss as a class.

1.2

PERCENTS APPLICATIONS

PRETEST

Write as a percent.

1. 0.293   2. 1.325   3. 0.01   4. 1/5

Write as a decimal.

5. 38%   6. 23 1/3%   7. 1.2%   8. 100%

9. 75%   10. 16.4%   11. 33 1/3%   12. 2%

Write an equation and solve.

13. 4 is what percent of 48?

14. 21 is what percent of 79?

15. 35% of 26 is _____ .

1.3a

PERCENTS APPLICATIONS

ANSWER KEY

1. 29.3
2. 132.5
3. 1%
4. 20%
5. 38
6. 23 1/3
7. .012
8. 1
9. 3/4
10. 41/250
11. 1/3
12. 1/50
13. 8.3%
14. 26.5%
15. 9.1

1.3

VOCABULARY

percent - a measure of parts per hundred

equation - an open sentence with an equals sign (=) as its verb. Example, $3X = 25$ and $X + 5y = 33$ are equations.

mixed decimal - decimals that have a whole number and decimal part

numerator - in a fraction, the number appearing above the fraction bar.

denominator - in a fraction, the number appearing below the fraction bar.

improper fraction - a fraction in which the denominator is equal to or less than the numerator.

conversion - change into another form the act of converting

1.4.1

PERCENTS

Explain the three ways to represent a number expressed in hundredths: as a percent, as a decimal, as a fraction.

EX. Write 52 hundredths on the chalkboard. Have the students write it as a percent, a decimal, and a fraction.

(52%, o.52, 52/100)

52 hundredths = 52%
52 hundredths = .52
52 hundredths = 52/100

EX. Write 100% as a decimal.

100% = 100 hundredths
$= 1\underset{\curvearrowleft}{.00} = 1$

1.4.2

WRITING PERCENTS AS DECIMALS

Write 15% as a Decimal.
15% = 0.15

To write a percent as a decimal write the number without the percent sign (%) and move the decimal point two places to the left.

EX.:
1. Write 125% as a decimal.
   1255 = 1.25
2. Write 5% as a decimal.
   5% = 0.05
   (add zeros if necessary when you move the decimal point)
3. Write 0.2% = as a decimal.
   0.2% = 0.002
4. Write 8.34% as a decimal
   8.34% = 0.0834
5. Write 1 7/8% as a decimal.

   1 7/8% = 0.01 7/8
   0.01 7/8 = 0.01875

1.4.3

WRITING DECIMALS AS PERCENTS

If you have found the answer to a problem to be 0.07, how can you write this decimal as a percent? How can you write a mixed decimal such as 1.34 as a percent?

EX. 1. $0.07 = 0.\underset{\curvearrowright}{07}$ hundredths

7 hundredths = 7%

Move the decimal points 2 places to the right to express as hundredths. Write % in place of hundredths

2. $1.34 = 1.\underset{\curvearrowright}{34}$ hundredths

134 hundredths = 134%

3. Write 8 as a percent.
$8 = 8.\underset{\curvearrowright}{00}$ hundredths

800 hundredths = 800%

1.4.4

WRITING PERCENTS AS FRACTIONS

You have learned to write a percent as a decimal representing hundredths. Remember that a percent is a ratio per hundred. How can you write a percent as a fraction?

Examples:

1. Write 8% as a fraction.

$$8\% = \frac{8}{100} = \frac{2}{25}$$

(Since percent means hundredths, the given number is the numerator and 100 is the denominator. Simplify.)

2. Write 25% as a fraction.

$$25\% = \frac{25}{100} = \frac{1}{4}$$

If the fractional equivalent is known, write it directly.

3. Write 130% as a mixed number.

$$130\% = \frac{130}{100} = 1\ \frac{30}{100} = \frac{3}{10}$$

4. Write 8 1/3 as a fraction.

$$\frac{8\ 1/3}{100} = 8\ 1/3 \div 100 = \frac{25}{3} \;-\,-\; 100 = \frac{\overset{1}{\cancel{25}}}{3} \times \frac{1}{\underset{4}{\cancel{100}}} = \frac{1}{12}$$

1.4.5

WRITING FRACTIONS AND MIXED NUMBERS AS PERCENTS

There are times you may need to write a fraction or a mixed number as a percent. What technique would you use to write a fraction as a percent? How would you write an improper fraction as a percent?

Examples:

1. Write 18/25 as a percent.

```
                 0.72
18/25  =   25 )18.00   =  72%
               17 5
                  50
                  50
                   0
```

(Divide the numerator by the denominator in order to write as a decimal. {hundredths} Rewrite hundredths as a percent.)

2. Write 2/9 as a percent.

```
               0.22 2/9     .22 2/9  =  22 2/9%
2/9  =   9)2.00
           18
            20
            18
             2
```

3. Write 55/40 as a percent.

```
                           1.37 4/8
55/40  =  11/8           8)11.0           1.37 4/8  =  137 1/2%
                            8
                            30
                            24
                             60
                             56
                              4
```

4. Write 18/100 as a percent

18/100 = 18%

(If the denominator is 100, write the numerator followed by the percent sign.)

5. Write 4/25 as a percent.

$$\frac{4}{25} = \frac{4 \times 4}{25 \times 4} = \frac{16}{100} = 16\%$$

(Write an equivalent fraction with a denominator of 100 by either raising to higher terms or reducing to lower terms.)

1.4.6

RULES FOR PERCENTS

1. Writing a percent as a decimal. Move the decimal point two places to the left and drop the percent sign.

2. Writing a percent as a fraction. Drop the percent sign and write a ratio of the number to 100. Then write the ratio as a fraction in lowest terms.

3. Writing a decimal as a percent. Move the decimal point two places to the right and add a percent sign.

4. Writing a fraction as a percent. Write the fraction as a decimal and then use the rule for decimals.

1.4p

WORKING WITH PERCENTS -- PRACTICE

Write as a Decimal.

1. 44%   2. 500%   3. 150%   4. 5%

5. 80%   6. 15.8%   7. 25%   8. 89.80%

Write as a Percent.

9. 0.37   10. 0.06   11. 0.47   12. 0.08

13. 0.7   14. 0.66   15. 0.84   16. .7556

Write each percent as a Fraction.

17. 50%   18. 9%   19. 110%   20. 33 1/3%

Write each fraction and mixed number as a percent.

21. 18/200   22. 7/100   23. 5/6   24. 12/300   25. 16/25

26. If 7/10 of the employees participated in the workforce education program, what percent of the employees did not participate? (Write as a percent.)

27. If a sewing machine operator completed 94% of her work in one week without error, in what part of the total work did errors occur? (Write as a fraction)

28. John has computed that 0.38 of his total pay is deducted for taxes, medical insurance, social security, etc. What percent of his pay is deducted?

29. Bill is not sure how to write 7/25% as a decimal. He needs this conversion to report the fabric used on a spread. Make this conversion for him.

30. If 8% of a roll of fabric is wasted when a spread is made and cut, write the decimal form of the fabric waste.

1.4a

ANSWER KEY -- PRACTICE

1. 0.44
2. 5
3. 1.5
4. 0.05
5. 0.80
6. .158
7. .25
8. 0.8980
9. 37%
10. 6%
11. 47%
12. 8%
13. 70%
14. 66%
15. 84%
16. 75.56%
17. 1/2
18. 9/100
19. 1 1/10
20. 1/3
21. 9%
22. 7%
23. 83 1/3%
24. 4%
25. 64%
26. 30%
27. 3/50
28. 38%
29. 0.0028
30. .08

1.5

FINDING A PERCENT

The cutting floor had 375 yards of fabric to spread. Once the markers were put down and the fabric was cut, 17 yards was considered waste. What percent of the fabric was waste?

To find a percent, write and solve an equation.

Let P stand for percent in decimal form.

Ask yourself: What percent of 375 is 17?

P X 375 = 17

P = 17/375

P = .0453

P = 4.53%

Ex. What percent of 18 is 9?

_____ X 18 = 9

_____ = 9/18 = 1/2 =0.5 =50%

Ex: 4 is what percent of 800?

4 = _____ X 800

4/800 = ____

1/200 = .005 = 0.5%

1.5p

FINDING A PERCENT -- PRACTICE

1. What percent of 28 is 21?
2. What percent of 48 is 12?
3. 16 is what percent of 25?
4. 13 is what percent of 65?
5. 36 is what percent of 180?
6. What percent of 10 is 8?
7. 15 is what percent of 60?
8. 160 is what percent of 200?
9. There are 200 company employees. If 46 of them are attending continuing education classes, what percent of the employees are attenting classes?
10. An inch represents what percent of a foot?

1.5a

FINDING A PERCENT -- PRACTICE -- ANSWER KEY

1. 75%
2. 25%
3. 64%
4. 20%
5. 20%
6. 80%
7. 25%
8. 80%
9. 23%
10. 8.3%

1.6.1

FINDING A NUMBER WHEN A PERCENT OF IT IS GIVEN

If a percent of a number is given and you need to find the number, change the percent to either a decimal or a fraction and divide it into the number given.

Ex. a) 25% of what number is 8?

25% = 25

$$\begin{array}{r} 32. \\ .25\overline{)8.00} \\ \underline{75} \\ 50 \\ \underline{50} \\ 0 \end{array}$$

25% of 32 is

Ex. b) 25% = 1/4

8 ÷ 1/4 = 8/1 X 4/1 = 32/1 = 32

Additional Examples:

1) 10% of what number is 6.3?

$$\begin{array}{r} .10\overline{)6.30} \\ \underline{6\ 0} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

10% of 63 is 6.3

2) 35% of what number is 8.4?

$$\begin{array}{r} 24 \\ 35\overline{)8.40} \\ \underline{7\ 0} \\ 1\ 40 \\ \underline{1\ 40} \\ 0 \end{array}$$

35% of 24 is 8.4

1.6.2

FINDING A PERCENT OF A NUMBER

Of 120 people surveyed, 75% preferred day shifts to night shifts. How many people preferred day shifts?

To answer this question, you can write and solve an equation. Let "n" be the number of people who preferred days.

Think What number is 75% of 120?

n = 75% X 120

First write 75% as a decimal or a fraction.

n = 75% X 120	n = 75% of 120
n = 0.75 X 120	n = 3/4 X 120
n = 90	n = 90

90 people preferred days out of 120 people.

Ex. 2% of 90

.02 X 90 = n 1/50 X 90 = 90/50 = 1 40/50 = 1 4/5
1.8 = n = 1.8

Ex. 40% of 60

.40 X 60 = n 2/5 X 60 = 120/5 = 24
24 = n

1.6p

FINDING A PERCENT OF A NUMBER -- PRACTICE

1. 25% of 96
2. 8% of 50
3. 75% of 52
4. 95% of 60
5. Joe is a roll loader. He reports 16% of 185 yards is left on a roll. How many yards are left on the roll?
6. 32% of what number is 12?
7. 18% of what number is 13.5?

1.6pa

FINDING A PERCENT OF A NUMBER -- PRACTICE

ANSWER KEY

1. 24
2. 4
3. 75% of 52
4. 95% of 60
5. 29.6 yds.
6. 37.5
7. 75

1.7

CULMINATING ACTIVITY

Group students and have them complete a survey. Upon completion have students prepare graphs to show their results. One group should make a circle graph, one group a bar graph. Then have them compare the graphs to see the results.

There are 246 people employed at Advanced Inc. Out of the 246 employees, 38 of them are in management or clerical positions, 23 work on the cutting floor, 16 are supervisors, 12 maintenance and other, the rest are machine operators. Find the percentage of employees in each area and design a graph.

1.8

POST TEST

Write as a percent.

1. 9/100   2. 7/25   3. 0.03   4. 0.569

Write as a decimal.

5. 62.5%   6. 5%

Write as a fraction.

7. 15%   8. 16.4%

Write an equation and solve.

9. 7 is what percent of 35?

10. 80% of 60 is a.

11. 50% of e is 18.5.

12. 19 is what percent of 20?

13. If a roll of fabric weighs 375 lb. how much does 30% of the roll weigh?

14. Alma earns $240 and 15% is taken out of her check for taxes. How much is taken out for taxes?

15. Mary hems scrub pants. She can hem 48 pairs of pants in 33.213 minutes. Her production goal is 29.918 minutes What is the percent of increase she is trying to reach?

1.8a

POST TEST -- ANSWER KEY

1. 9%
2. 28%
3. 3%
4. 56.9%
5. 0.625
6. 0.05
7. 3/20
8. 41/250
9. 7 = px35; 20%
10. 48
11. 37
12. 19 = px20; 95%
13. 112.5
14. $$\begin{array}{r} 33.213 \\ \underline{-29.918} \\ 3.295 \end{array} \qquad \begin{aligned} 3.295 &= \underline{\quad\%} \text{ X } 33.213 \\ &= .099 \\ &= 9.9\% \end{aligned}$$
15. $204

MODULE: Measurement and Numerical Skills

JG

GENERAL INSTRUCTIONAL OBJECTIVE: Utilize Occupational Specific Math **JOB TITLE:** Sewing Machine Operator

Specific Instructional Objective	Learning Activities	Resources/Materials	Evaluation (Process/Status)
III.A.500 Compute averages using whole numbers, fractions, decimals, or percentages.	A (5.1) Motivational Activity: Using spools of thread (unit cubes or other objects), find the average for a group of numbers. This activity gives concrete, hands-on examples of what averaging does.	Attachment 5.1 Spools of thread	Observation
	A (5.2) Pre-test	Attachment 5.2 Teacher made pre-test	5 item pre-test
	A (5.3) Pre-teach Vocabulary	Attachment 5.3	
	A (5.4) Instructional Activity: Introduce and discuss "Finding an average" using whole numbers. Have students work practice exercises and discuss.	Attachment 5.4 Attachment 5.4p	Observation
	A (5.5) Instructional Activity: Introduce and discuss "Finding an average" using fractions. Have students work practice exercise and discuss.	Attachment 5.5 Attachment 5.5p	Observation

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A (5.6) Instructional Activity: Introduce and discuss "Finding an average" using decimals or percents.	Attachment 5.6 Additional Practice Math Skills That Work Book two, p.58 Attachment 5.6A Pridecraft Variable Control Chart	Observation
A (5.7) Culminating Activity: Have students work in pairs to complete a chart of averages among 5 employees. Discuss answers as a group.	Attachment 5.7	Observation
A (5.8) Administer Post-test	Attachment 5.8	10 item post-test

WORKPLACE LESSON PLAN

Job Title: Sewing Machine Operator
Module: Measurement and Numerical Skills
General Instructional Objective: Utilize Occupational Specific Math.
Specific Instruction Objective: Compute averages using whole numbers, fractions, decimals or percentages.

MOTIVATIONAL ACTIVITY:

Spool Activity - Using spools of thread (unit cubes or other objects.), find the average for a group of numbers. This activity gives concrete, hands-on examples of what averaging does.

ADMINISTER PRE-TEST

PRE-TEACH VOCABULARY

INSTRUCTIONAL ACTIVITIES:

Introduce and discuss "Finding an Average" using whole numbers. Have students work practice exercises and discuss.

Introduce and discuss "Finding an Average" using fractions. Have students work practice exercise and discuss.

Introduce and discuss "Finding an Average" using decimals or percents.

CULMINATING ACTIVITY:

Apply the grouping and averaging from the Motivational Activity and have students work with a partner to complete a chart with averages. Review.

Administer Post-test. Evaluate to see if review is necessary.

(5.1)

MOTIVATIONAL ACTIVITY

SPOOL ACTIVITY

Arrange spools of thread in a group of 3 and a group of 7. Ask students: How many are there in all? (10) Can we arrange the spools so there is an equal number in both groups? (yes, 5 in each group) Have a student arrange them. Ask: How many are now in each group? (5) Tell the students that the average number of spools for the two groups is 5. Tell them another word for average is mean.

Then arrange the ~~cubes~~ spools in a group of 3, 8, and 4. Ask: How many spools are in the three groups altogether? (15) How can we rearrange the spools so that each group will have the same number? (Place 5 in each group.)

Write on the board.

Solve:

Ask: How do you find the average for a group of numbers? (Add the numbers and divide the sum by the number of groups.

(5.2)

PRETEST

COMPUTING AVERAGES

1. A sewing machine operator completed 3 bundles, 5 bundles, 3 bundles, 4 bundles, and 6 bundles over 5 days. What was the average number of bundles completed each day?

2. An inspector measured lab coats at 35.6 inches, 42.3 inches, 38.7 inches and 40.5 inches. What was the average measurement for the lab coats?

3. What is the average of the following?

   2/10, 3/5, 1/2, 9/10, 4/5

4. Martha's production for 5 days was recorded as follows: 98%, 89%, 94%, 100%, 104%,. What was her average production?

5. Find the average:

   a. 37, 43, 69, 18, 23, 52, 71

   b. 4.08, 11.35, 17.62, 8.19, 13.71, 19.84

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(5.3)

VOCABULARY

1. average
2. mean
3. data
4. reciprocal

(5.4)

FINDING AN AVERAGE USING WHOLE NUMBERS

The average, or mean, is a good measure for describing the middle amount of a collection of data. To find the average or mean, of a set of data, divide the total by the number of parts.

Ex. 1) A student's scores on five math tests were 95, 75, 84, 70 and 98. Find the average.

Solution:
Step 1.) Find the sum of the numbers:

$$95 + 75 + 84 + 70 + 98 = 422$$

Step 2.) Divide by 5 the number of items:

$$\begin{array}{r} 84\text{ r. }2 \\ 5\overline{)422}\phantom{\text{ r. }2} \\ \underline{40}\phantom{\text{ r. }2} \\ 22\phantom{\text{ r. }2} \\ \underline{20}\phantom{\text{ r. }2} \\ 2\phantom{\text{ r. }2} \end{array}$$

The average score is 84 2/5.
2/5 is less than 1/2 so we round down to 84.

Ex. 2) Find the average. 5,1,3,4,7,7,9,4

$$\frac{5+1+3+4+7+7+9+4}{8} = \frac{40}{8} = 5$$

Ex. 3) Find the average shoe sizes of classmates.

Sometimes you must find the average when the total amount is given.

Ex. 4) A technician worked 63 hours in 9 days. What were his average hours per day?

Divide 63 by 9.
He averaged 7 hours per day.

Reminder:

An average is usually not equal to any of the numbers in the group you add. However, it is often close to the middle value of the group.

(5.4p)

FINDING AN AVERAGE USING WHOLE NUMBERS

PRACTICE

Find the average. Round to the nearest whole number.

1. 28, 37, 54

2. 284, 219, 345

3. 8105, 8005,8009

4. 76, 176, 276, 376, 476

5. 5047, 3405, 5912, 4000, 4935

6. A sewing associate works five days a week. Last week she earned:

   $64, $72, $69, $74, $58

   How much did she average per day?

7. During a four week period a technician has the following seconds reported:

   27, 13, 19, 33

   Find the average number of seconds she reports.

(5.4p)

ANSWER KEY

1. 40
2. 283
3. 8040
4. 276
5. 4660
6. $67.40
7. 23

(5.5)

FINDING AN AVERAGE USING FRACTIONS

Finding the average of fractions follows the same steps as finding the average of whole numbers. However, the rules of fractions must be followed as well.

Ex. 1) Find the average of 70 1/2, 69 3/4, 70 1/4, 69 1/2

Step 1 - add

$$\begin{array}{rr} 70\ 1/2 & (2/4) \\ 69\ 3/4 & (3/4) \\ 70\ 1/4 & (1/4) \\ +69\ 1/2 & (2/4) \\ \hline 278 & 8/4 = 2 \\ +\ 2 & \\ \hline 280 & \end{array}$$

(Find a common denominator)

Step 2 - divide

$$\begin{array}{r} 70 = \text{average} \\ 4\overline{)280} \\ \underline{-28} \\ 0 \\ \underline{-0} \end{array}$$

Ex. 2) Find the average of 2/7, 3/4, 1/2

1. Add:

$$\begin{array}{rcr} 2/7 & & 8/28 \\ 3/4 & & 21/28 \\ \underline{+1/2} & & \underline{+14/28} \\ & & 43/28 \end{array}$$

2. Divide by 3 (total number of items)

$43/28 \div 3$

(to divide, multiply by the reciprocal of the divisor.)

$$\frac{43}{28} \times \frac{1}{3} = \frac{43}{84}$$

If using a calculator, fractions can be computed to decimals and averaged as decimals (to be discussed)

Ex. 1/2 = 0.5 3/4 = 0.75

(5.5p)

FINDING AN AVERAGE USING FRACTIONS

PRACTICE

Find the average:

1. 2/3, 3/5, 1/3

2. 1/2, 2/6, 3/4

3. Find the average weight of a cut of cloth if four cuts weigh as follows:

   15 7/8 pounds, 15 3/4 pounds, 16 pounds, 15 7/8 pounds

4. There are four measurements done by an inspector. They are 2 1/6 inches, 1 4/12 inches, 2 1/3 inches, 3 2/3 inches. Find the average.

(5.5p)

ANSWER KEY

1. 8/15
2. 19/36
3. 15 7/8 pounds
4. 2 3/8 inches

(5.6)

FINDING AN AVERAGE USING DECIMALS AND PERCENTS

To find an average using decimals, follow the same rules as applied to whole numbers. Add then divide. Follow your rules for adding and dividing decimals.

Ex.) Find the average:

3.21, 4.56, 2.19

Add.

3.21
4.56
+ 2.19

Divide.

$\overline{3.32}$ = average
3)9.96
9
.96
-9
6
-6
0

To average percents, change the percent to a decimal and follow the steps.

Ex. 96%, 85%, 75%

(Drop the percent sign and move the decimal two places to the left.)

Add

.96
.85
+.75
2.56

Divide

$.853\overline{3}$
3)2.56
-2 4
16
-15
10
- 9
10

(5.6a)

The Variables Control Chart is an example of in plant averaging that goes on daily.

The measurements taken each hour are averaged to get x. (x-bar is the average) In SPC you will also see x (x double bar). This is an average of the averages.

Attachment 5.6a shows measurements at 8:00 as 54.2, 54.4, 54.1 the sum is 162.7

$$x = \frac{162.7}{3} = 54.2333 = 54.2$$

Have students check the sums and x of the 9:00 and 10:00 times.

Attachment 5.6a

VARIABLES CONTROL CHART ($\bar{X}$ & R)

PART NO
CHART NO
NAME (PRODUCT)
OPERATION (PROCESS)
SPECIFICATION LIMITS
OPERATOR
MACHINE
GAGE
UNIT OF MEASURE
ZERO EQUALS

DATE																										
TIME		8:00	9:00	10:00																						
SAMPLE MEASUREMENTS	1	54.2	54.0	54.1																						
	2	54.4	54.2	54.4																						
	3	54.1	54.1	54.3																						
	4																									
	5																									
SUM		162.7	162.3	162.8																						
AVERAGE, $\bar{X}$		54.2	54.1	54.3																						
RANGE, R		.3	.2	.3																						
NOTES																										

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

AVERAGES

RANGES

BEST COPY AVAILABLE

(5.7)

POST-TEST

COMPUTING AVERAGES

Find the average of the following:

1. 32.5, 19.2, 8.7, 14.2

2. 21, 18, 32, 27

3. 138, 240, 90

4. 2 1/2, 3 1/4, 5 1/2, 1

5. 32%, 20%, 23%

6. 1/2, 2/3, 3/6

7. The shipping department received 6 boxes weighing 18 kilograms, 22 kilograms, 13 kilograms, 9.6 kilograms, 16.2 kilograms, and 14.2 kilograms. What is the average weight of the boxes?

8. In five working days, Joan completed 98% of her work 3 days and 94% the other 2 days. What was the average amount completed each day?

9. Operator 17 completed 189 bundles in 9 days. What was the average number completed each day?

10. A sewing associate worked 420 minutes, 395 minutes, 480 minutes, and 472 minutes. What was the average number of minutes worked?

(5.7)

ANSWER KEY - POST-TEST

1. 18.65
2. 24.5
3. 156
4. 3 1/16
5. 25%
6. 5/9
7. 15.5
8. 96.4%
9. 21 bundles
10. 441.75 minutes

(5.8)

CULMINATING ACTIVITY

Have students work in pairs to complete a chart of averages among 5 employees. When the charts are completed, discuss the answers as a group to compare.

Find the average for each column.

Operator #	Seconds	Bundles	Minutes	Production	
13	18	3 1/2	392.32	98%	1/2
31	12	2 1/3	376.87	85%	3/4
45	21	4	468.29	100%	2/3
23	16	3 2/3	432.71	91%	1/2
52	5	4 1/4	480	102%	1/4
Average	(14)	(3 11/20)	(430.04)	(95%)	(8/15)

(5.8)

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Average →					